# Research Aff

## 1AC

### Notes

* Fundamental vs applied research
* Off-campus research
* NSDD legislation
* what is information?
* right to information?

#### STILL NEED –

other private sources fill in

government will stop with the restrictions

See Leslie Brueckner and Michael Borrus, “The Commercial Impact of the VHSIC Program,” in Edwards and Gordon, op. cit. Also see Charles H. Ferguson, “The Microelectronics Industry in Distress,” Technology Review, August/September, 1983.

The Academy also established a Committee on a “New University-Government Partnership for Science and Security,” to hold regional meetings that will 1) bring together faculty and research administrators, government officials from research and national security agencies, and congressional members; and 2) focus on a. restrictive clauses in federal contracts and grants; b. dissemination of scientific information; c. sensitive but unclassified information; and d. the management of biological agents in academic research.221

#### Public colleges and universities ought not restrict constitutionally protected speech in the form of federal research contracts that limit fundamental research.

#### solvency advocate

Krieger 8 [Lisa Krieger (science writer at The Mercury News, covering research, scientific policy and environmental news from Stanford University, the University of California, NASA-Ames, U.S. Geological Survey and other Bay Area-based research facilities), "Top schools choosing academic freedom over government research restrictions," Mercury News, 7/29/2008] AZ

Caught between the demands of academic freedom and national security in a post-Sept. 11 world, the Bay Area’s two major research universities are walking away from lucrative research contracts rather than consenting to intrusive restrictions on their work. A new major study of 20 top schools found 180 instances of “troublesome clauses” attached by the federal government to research contracts – up from 138 in 2004. The survey, conducted by two Washington, D.C.-based groups, Association of American Universities and Council on Governmental Relations, concluded that the vast majority of disputes involve the U.S. Department of Defense or defense contractors. The University of California-Berkeley reported 12 cases in which restrictions led to impasses in research grant negotiations; Stanford University reported three. University officials would not elaborate on how many of those cases were resolved – or how much money the schools lost by passing up grants. Federally funded research is crucial to UC-Berkeley and Stanford. But so is their ability to share discoveries with the vast scientific community in classrooms, conferences and journals.

### 1AC – Semiconductors

#### Acceptance of the government contracts restricts fundamental research

FDP 08 [(Federal Demonstration Partnership) “RESTRICTIONS ON RESEARCH AWARDS: TROUBLESOME CLAUSES 2007/2008” A REPORT OF THE COUNCIL ON GOVERNMENTAL RELATIONS (COGR) ASSOCIATION OF AMERICAN UNIVERSITIES (AAU) July 2008] AT

The 2004 report also presented information on the eventual disposition of these restrictions by the institutions. In nearly all cases, the terms and conditions were negotiated between the institutions and the sponsors. Three institutions rejected awards due to the inability to negotiate the terms of the DFARS 7000 clause, while six rejected awards that contained other terms restricting publication. Four awards were rejected because of foreign national restrictions, and two were rejected because of other restrictions on access to or dissemination of research results. In many instances, alternative terms and conditions were successfully negotiated. However, where the participating institutions were unable to negotiate any changes, they accepted the 7000 clause or other publication restrictions in 29 instances and accepted restrictions on foreign nationals in 10 instances. In circumstances where the participating institutions accepted the 7000 clause, they indicated that it was done reluctantly and only after long negotiation with the sponsors. In some cases, institutions reported that the decision to accept was based on the nature of the research or that inclusion of the clause was unlikely to harm graduate students or faculty; the programmatic value in performing the research outweighed the risk of rejecting the award. The report indicated that in 75 percent of these cases, resolution of the issues took more than one month; in 25 percent of the cases, resolution took between three and six months. Three cases took more than six months. The report noted that “failure to reach timely resolution of these troublesome clauses creates hardships, sometimes quite severe. Delays may cause students not to be hired to work on projects and may delay significantly completion of theses and dissertations. Faculty and researchers are often forced to turn their attention and talents toward research projects that do not involve these difficulties. For a sponsoring agency, delays may unduly restrict an agency in its mission to have research performed….” The report also noted that lengthy negotiations harm the conduct of research of high value to the nation. The federal government and industry increasingly depend on universities to perform fundamental research that sustains the nation’s leadership in education and innovation. Unfettered transmission of knowledge is a core value of higher educational institutions. Most have a formal policy against accepting sponsor restrictions on publication or information disclosure; many also preclude discrimination on the basis of nationality in activities conducted on campus. Significant time delays imposed by negotiation of these restrictions, and, in some cases, failure to reach agreement, threaten the ability of universities to pursue research of national importance. The report made two general recommendations: (1) that agencies adhere to the spirit of NSDD-189 by not imposing publication and/or foreign national restrictions on fundamental research projects undertaken by universities; and (2) that agencies distinguish between the open nature of university research and that done by industry under restricted circumstances, and make clear to industrial prime awardees that restrictions on publications and foreign national participation need not be flowed down to university subawardees where the purpose is fundamental research. The report specifically recommended that DOD revise the DFARS prescription guidance to provide that the 7000 clause not be used in contracts for university research, either directly or as a flow down.

#### These restrictions gut semiconductor research, advanced materials research, and defense cooperation with allies abroad

Atta 07 [Richard Van Atta, Project Leader “Export Controls and the U.S. Defense Industrial Base Volume 1:Summary Report Volume 2:Appendices” INSTITUTE FOR DEFENSE ANALYSES Jan 2007] AT

The “ITAR-tainting” issue creates a different type of problem. In this case US firms—such as advanced material developers—find themselves reluctant to engage in R&D activities funded by the Department of Defense because this raises future prospects that the products based on this R&D—although intrinsically commercial—will be saddled with ITAR controls due to the link to defense-funded R&D. The impact on firms is that it reduces the sources of R&D funding, if firms see the ITAR constraints as excessive, and even has driven firms to conduct their R&D abroad. The impact on DoD is that it discourages potential partnerships that might provide advantages for future defense applications. The increasing intrusiveness and implicit distrust conveyed by US export control implementation with respect to China—a market that is expected to fuel the next stage of growth and development for semiconductor and machine tool firms as well as other high technology industries—threaten to make US companies unattractive business partners. The costs of compliance, particularly with some of the proposed measures aimed at China, are becoming a matter of concern for US firms and represent a unilateral disadvantage to US-based firms in increasingly competitive international markets. For example, the risk and difficulty of complying with “deemed exports” regulations—a license that must be obtained before providing to foreign nationals information related to controlled technologies—has led some US companies to no longer hire foreign nationals, thus restricting their access to talented scientists and engineers. These qualitative factors—unreliability in supply, the unilateral nature of export control measures, restricted access to foreign talent, and barriers to developing a foothold in emerging markets such as China—could eventually be reflected in diminished competitiveness of leading-edge US industries. In order to take advantage of global talent and develop customized offerings for foreign markets, industrial enterprises around the world are increasingly distributing globally and becoming intensely interactive throughout their supply chains. If US export controls inhibit US firms from competing in the changing global business environment, this may disrupt US industry’s supply chain and technology development strategies, and choke off promising market expansions and diversification opportunities. In interviews with individual firms it is apparent that US companies are already being constrained in supply chain choices by export control restrictions. In some cases export control measures are actually encouraging R&D and capital investment overseas, as well as discouraging R&D partnerships with US firms and 4 the DOD. (These ideas will be developed in more detail in the “Overall Conclusions” subsection.) Furthermore, certain near-term issues, if unaddressed, could lead to additional problems for the US industry. Proposed changes to Department of Commerce rules for dual use exports to China, if adopted, would cause currently decontrolled items to come under tighter scrutiny. The new rules would require US firms to confirm the commercial nature of customers and end-users in China, with potentially severe penalties for exporting equipment or technology that was found to have a military end-use. For companies producing general purpose equipment or materials, such verification could be impossible, conferring potentially open-ended liability on US firms. (This problem could be mitigated by the “Validated End-User” provisions of the proposed rules—which would provide a blanket license for the export of specifically approved items to specific foreign entities—though it is unclear how readily that designation will be given and how much of the export control burden it will relieve.) Also, the prospective shift of controls on semiconductors from the CCL to the much more restrictive ITAR, due to outdated criteria for radiation tolerance of microelectronics, could make their products non-competitive—products that today are essentially uncontrolled. C. SECTOR FINDINGS In the four industries studied, the study teams found the following: o Satellite manufacturing: There is little quantitative evidence that export controls have diminished US satellite prime contractors’ success in international markets. However, because state-of-the-art communications satellites and components have become available from multiple global sources, specific technical criteria related to military criticality should be used to determine when the ITAR needs to be applied to these exports. Otherwise, US industry runs the risk of being impaired, if not disadvantaged, in the future satellite market, without achieving any national security benefit. Moreover, the large backlogs and long processing times for processing ITAR cases have become a serious issue for satellites (as well as for defense-related trade overall). This issue needs to be addressed. In addition, for satellites, the value and costs of requiring detailed monitoring of meetings with foreign satellite customers and partners should be reconsidered. 5 o Semiconductor Industry: Semiconductor device firms and semiconductor materials and equipment firms did not report significant lost sales or competitive impacts from application of US export controls. However, the proposed CCL rule changes involving China and expansion of deemed exports controls could have significant impacts on the competitiveness of the industry going forward, including foreign migration of manufacturing capabilities and technical talent. A critical issue on the horizon is the potential shift of control of semiconductor integrated circuits from the CCL to the ITAR due to the increasing radiation tolerance conferred by modern manufacturing methods. Under current “see through” rules, systems containing controlled integrated circuits would be considered controlled items as well, which, if not addressed, would create a serious impediment to the US export market for electronic goods as well as integrated circuits themselves. o Machine Tools: Data going back more than a decade suggest that declining US machine tool exports are due to the loss of competitiveness of US machine tool producers, not due to unilateral US export controls. US industry made strategic decisions back in the 1980s to focus on the US automobile industry and cede other segments of the business to foreign firms. Those decisions, along with changes in the composition of US automobile manufacturing, account for the current state of the industry. However, for firms in certain advanced technology areas—critical to both defense and commercial markets, particularly aerospace—differential US application of export controls is leading to product development being moved overseas, as well as dampening global sales to China, the fastest growing market. o Advanced Materials: Advanced materials, such as carbon-fiber polymer matrix composites, CF-PMC, are employed in an increasing variety of products, from tennis rackets to auto bodies to missiles and aircraft. Commercial aircraft are the fastest growing market for this material. The burgeoning market for these materials is encouraging new production facilities worldwide. Employing CF-PMC requires considerable interaction throughout the value chain from the fiber producers up through intermediate materials suppliers to the integrated product producers, making the industry increasingly affected by export controls. (Materials themselves, e.g., fibers and the prepregs, are largely not controlled; rather, controls apply mainly on 6 the technical know-how for employing them in integrated products.) The US CF-PMC industrial base today is robust and growing, but the major US firms are concerned that inhibiting their relationships with downstream integrators will encourage these integrators to develop alternative foreign sources and shift advanced R&D offshore. Executive summaries of the reports for these four industries appear in Section II. The full reports are published in a separate volume of appendices. D. CONCLUDING OBSERVATIONS The current US export control system appears to be out of step with today’s world of global manufacturing, technology development, and capital flows. Technology products often use components or manufacturing services from a variety of countries based on competitive advantages in niche areas. Countries that buy technology products from the US typically do so because US firms offer the best value, not because the country could not obtain the products from a variety of sources worldwide or produce the necessary technologies domestically. Selling, sourcing, and teaming internationally are increasingly important for competing as a global technological enterprise. Inhibiting these international business relationships makes enterprises more insular and less responsive to customers. When US export controls interfere with foreign partnering in high tech systems development, they encourage advanced technology and manufacturing investment to take place overseas. This practice has already begun in the machine tools and the advanced materials industries and is likely happening in the semiconductor industry as well. In the satellite industry, the increasing number of foreign components advertised as “ITAR free” testifies to the perceived advantage to satellite developers of avoiding US export controls. Quantitative analyses on historical data miss these emergent trends and dynamics. In sectors such as integrated circuits and advanced materials, US producers still have a reservoir of intellectual property, product capabilities and process know-how built over several decades. These historical advantages naturally dissipate as global capabilities rise and need to be replaced with new competencies tightly linked with global supply chains in order to maintain US firms’ market position and technological leadership. This erosion is hard to perceive clearly until it shows up in hard data, at which point it may be impossible to reverse. 7 These increasingly global dynamics of the high-tech industrial sectors make it more difficult to implement export controls effectively. With Europe, Japan, South Korea and Taiwan having become highly competitive across the range of advanced technology sectors, and China and India not far behind; global firms are seeking to access global markets through joint ventures and partnerships. With multiple potential sources dispersed throughout the globe, the ability of governmentally-imposed controls to limit technology transfer and development is becoming increasingly difficult. Boeing, the US- based leader in commercial aircraft, and US-based Hexcel, the largest advanced composite materials producer, are in partnership with China’s leading commercial and military aircraft producer, AVIC-1, to produce composites structures for the 787 and a host of other commercial aircraft. At the same time, its main competitor, Airbus, as well as several other lower-tier aircraft makers, such as Embraer of Brazil and Bombadier of Canada, have set up extensive production facilities including final assembly lines, in China.6 Major microelectronics firms based in several countries—Motorola, Intel, Samsung, Toshiba, TSMC and others—are undertaking Chinese joint ventures. Microsoft’s advanced technology research center in China pursues world leading research in self-forming, self-healing, distributed communications networks, a capability also being pursued avidly by the US DoD.7 This dispersion and interconnectedness of technology development and production creates a fundamental challenge to the ability to effectively implement export controls. Moreover, there are potential impacts on future US defense capabilities in instances where US export controls have interfered with international defense cooperative programs, through their effects on domestic suppliers of US foreign military sales and associated export trade offsets. Of particular concern in an age of increasing coalition warfare are the impacts of controls on DoD development and acquisition with close allies, through their impedance of foreign partnerships necessary to major new defense programs such as the F-35 Lightning (Joint Strike Fighter). There are similar impacts on offshore manufacturing partners of America’s legacy military systems for DoD’s own use. Given this rapidly transforming world of global enterprise, it may be time to assess more broadly how these global economic dynamics impact the effective implementation of export controls. Some questions for such an assessment could include: What is the role of technology exports in supporting emerging coalition warfare needs and how do export controls affect these? Are unilateral export control measures damaging the economic competitiveness of US firms and allowing others to expand their market positions, without achieving our security goals? Given the access to global networks of technology and supply, how do controls on advancing economies such as China or India, as the US is currently employing and implementing them, serve US security interests? Despite the global economic patterns discussed above, have controls had positive effects on slowing access to key technologies for such countries as North Korea and Iran? A. SATELLITE INDUSTRY This sector study focused on the impacts of ITAR on the US satellite industry. The study considered quantitative metrics such as lost revenues and unilateral costs, metrics on competitiveness, as well as qualitative impacts such as access to international talent. Data were collected via (1) interviews with industry, academia, and government officials; (2) government and industry reports; and (3) various open publications. From these sources, IDA constructed a database of global satellite sales, launches and subcontracts by region and by type for the period 1995-2006. This database was used to analyze the market position of US satellite prime contractors and subcontractors over time and to discern any changes in that position due to changes in export controls. Today, all satellite and satellite component exports are licensed through the ITAR process, administered by the US Department of State (DoS). Related services and technical data transactions must also be licensed under a Technical Assistance Agreement (TAA). A representative from the Defense Technology Security Administration (DTSA) must be present at all meetings with foreign persons (with exemptions possible for NATO and other major allies), and Congress must be notified of all contracts valued at more than fifty million dollars. Between 1995 and 1999, export of commercial satellites, components and services were regulated under the Commerce Control List, administered by the Department of Commerce. The CCL regulates exports of “dual use” technologies and equipment: i.e., items that are primarily used for commercial purposes but also have significant military applications. CCL controls generally are significantly less stringent and more transparent than ITAR controls. Throughout the period from 1997 to today foreign governments have regulated commercial satellite exports under their commercial export control regimes based on the “Wassenaar Arrangement on Export Controls for Conventional Arms and Dual-Use Goods and Technologies,” while in 1999 the US controls on satellites were moved by Congress to the ITAR from the CCL. Commercial satellites have become a global commodity with little difference between products offered by US and European primes in terms of performance, reliability, or ease of use. By applying ITAR controls to satellites, the US seeks to control technologies that are not tightly controlled by foreign 11 governments and are widely available from foreign sources. The changeover in US satellite export controls from CCL to ITAR in 1999 provides a basis for comparison of the impact of the US export control regime on the competitive position of US industry relative to their foreign competition—a concern that has been raised frequently by the US satellite industry. The Department of State is currently overwhelmed by the quantity of ITAR applications—an increase of more than fifty percent since 2000—with processing delays often reaching several months. The backlog of cases is massive and growing as of this writing. In one instance, consideration of a satellite company’s license application did not begin for six months after submission. License applications are processed case-by-case, with little transparency or predictability. The impact of processing delays and uncertainties is particularly acute for TAAs, directly affecting business development and execution of contracts. Because foreign suppliers do not face similar controls, US export controls and their implementation impose unilateral hurdles on US satellite makers and suppliers and risk creating dissatisfaction among foreign customer with US suppliers. Industry representatives cited specific cases in which contract awards were lost due to ITAR processing delays or the inability to share technical data to back up a US company’s offering. Additional licenses are required for failure investigations, and a foreign subsystem that is sent to the exporting country for repair must be licensed for its return to the customer, meaning that US firm importing that subsystem cannot respond rapidly to urgent customer needs. One US subtier supplier indicated that it might exit the international marketplace if a “solution to export controls (is) not found.” The precise economic impact of such delays and additional constraints on US satellite firms on the overall US satellite industry is difficult to discern against broader trends in the satellite industry, which is cyclical and “lumpy” due to the small number of launches in any given year. The transfer of export controls on satellites from CCL to ITAR in 1999 corresponded with a major downturn for the worldwide industry. Satellite manufacturers faced significant overcapacity due to the development of larger, longer- lasting satellites, and more efficient use of spectrum.8 The combination of growth in power, size, and design life make the average satellite of today approximately nine times more capable than the average satellite launched in 1990. Additionally in the mid-1990s, the European firms EADS and Alcatel aggressively entered the satellite market. Given these trends, US satellite revenue hit an all time low of $3.2 billion in 2005, and overall US market share decreased as well. The global export market is comprised primarily of commercial geosynchronous (GEO) satellites, and US commercial GEO satellites are the predominant US satellite export. From 1995-2006, export revenue from commercial GEO programs was about half of US firms’ total GEO revenues. The US has historically dominated the global GEO export market. However, US market share for satellite prime contractors between 1995 and 1999 (under CCL control) was 68% compared to 58% between 2000 and 2006 (under ITAR), while EU firms’ market share increased from 19% to 28% during the same periods. US industry cites this shift as evidence of the impact of tighter export controls. For example, Canadian TELESAT bought fifteen satellites from US vendors prior to 1999 but acquired the last three from Astrium, stating to the US vendor, “We will not buy from US due to export controls.” Nevertheless, analysis indicates that changes in US GEO market share have been consistent with trends in the global GEO and domestic US satellite markets. Due to the small number of launches, market share can vary widely by manufacturer and by region from year to year. For instance, US market share in 2005, measured in revenues, was 37%, but in 2006 it was 75%. Thus, while the entry of European firms into the satellite market clearly created additional options for the satellite telecommunications service providers, the data is not conclusive that export controls have had a major impact on the competitive position of US satellite makers and subtier suppliers. Major telecommunications service providers represent a large share of the commercial GEO market. These customers tend to purchase from companies from a specific region. Eutelsat, a European intergovernmental organization, has always purchased from European companies. Similarly, many US companies only buy US-made satellites. Moreover, customers switch manufacturers within a region: Data show that customers will often change prime contractors, even within major constellations. Viewed from the perspective of customer buying trends, Canadian TELESAT is the only example of a major customer permanently moving away from US manufacturers after the change in export jurisdiction from CCL to ITAR. Arabsat, while blaming ITAR for not buying US satellites, has actually never purchased a US satellite. ITAR controls may have contributed to a drop in US sales to European customers, but the US presence in Europe was small to begin with. 13 While China has never been a large GEO customer, those satellites it has imported have been mainly from the US. However, since 1999 a European firm has won a few contracts. Over the next decade the Teal Group forecasts sixteen Chinese satellite programs scheduled with all of these being indigenous. With the Chinese seeking to produce satellites for themselves, there are no major market opportunities in China for ITAR to impact. China claims to be achieving “many important technology breakthroughs through independent research” and, as in other technology areas, is pursuing increasingly sophisticated indigenous capabilities. This raises the prospect that in the future China may be a competitor in satellites rather than a customer. Satellite component markets tend to be linked to the prime contractors and hence show the same regional biases: European primes tend to use European subcontractors, and US primes buy from US firms. Because US component manufacturers did not have a large share of the European market before 1999, US firms did not appear to lose market share abroad following the 1999 ITAR change (though the study’s data on this was limited). Outside Europe, the US component manufacturers have increased their foreign market share. Recent moves by European firms, which sometimes advertise their offerings as being “ITAR-free,” may erode the small foothold US component manufacturers have in emerging foreign markets. Universities have claimed that export controls make US graduate school less attractive relative to their foreign competition, inhibit their foreign faculty in their research, interfere with cooperative research with foreign nationals, and force universities to decline certain research grants. Analysis of the data did not confirm any of these effects, though data specific to the satellite industry was not readily available. In conclusion, export controls are only one factor in the buying decisions of satellite customers. European capabilities and presence were growing relative to the US before the shift from CCL to ITAR, and all existing manufacturers can expect to lose market share as emerging countries develop indigenous capabilities. All in all, there is little quantitative evidence that export controls have diminished US prime contractors’ success in international markets. This being said, strong and increasing foreign availability raises strong doubts as to whether US export controls have any benefit for US national security that would justify stringent ITAR controls. If the intent of US export control policy on satellite technology is intended to keep China behind the state of the art, to keep US firms ahead of rest of world, or to sustain US industrial capabilities, these policies have failed. If anything, export controls have likely 14 spurred foreign governments to develop their own industrial capabilities and avoid use of US technology. The study team recommends that the US adopt specific technical criteria related to military criticality, via the Commodity Jurisdiction Review process, in order to determine whether ITAR controls should be applied to particular satellites and components. The value and need for detailed DTSA monitoring of satellite- related meetings with foreign customers and suppliers should be reconsidered. Moreover, the serious breakdown in ITAR case processing should be rectified. B. SEMICONDUCTOR INDUSTRY For the purposes of this sector study, the “semiconductor industry” comprises firms producing semiconductor materials, semiconductor manufacturing equipment (SME), and semiconductor integrated circuits (ICs).9 Worldwide revenues in 2005 were $31 billion, $34 billion, and $227 billion, respectively. The semiconductor industry is widely viewed as “strategic,” supporting economic growth through innovative clusters of electronics and broader information technology (IT) firms (such as in “Silicon Valley”), as well providing high value-added exports and high-wage employment. Beyond the economic importance of the semiconductor industry, today’s dominant US conventional military capabilities derive from the US Department of Defense’s relative success in fostering and exploiting semiconductor-based computer, communication and sensor networks for military purposes. Advantages in “network centric warfare” based on advanced electronics, is assumed in much of current US defense strategy and planning. While electronics and IT are critical to US military capabilities, the most advanced ICs today play a relatively small role, and the US Department of Defense (DoD) is a niche player in the market. With a few exceptions in areas such as sensors and intelligence systems, the ICs embedded within today’s most advanced military systems tend to be far from commercial state-of-the-art. Nevertheless, the US government has sought to prevent adversaries from accessing the most advanced ICs, SME and materials through the CCL, administered by the US Department of Commerce. Radiation hardened (RADHARD) ICs used in nuclear and space systems are controlled by the Department of State through the ITAR. US export controls are coordinated internationally through the “Wassenaar Arrangement on Export Controls for Conventional Arms and Dual-Use Goods and Technologies,” which came into force in 1996 as successor to the Soviet-era “Coordinating Committee for Multilateral Export Controls” (CoCom). US-based IC, SME and materials firms depend on exports. For US-based IC firms, much of their market is serving electronics products manufacturers (both US and foreign-owned) located outside of the US. For SME and materials firms, this is due to rapid growth of advanced IC manufacturing in Taiwan, China and Korea (a significant portion of which is due to foreign direct investment by US-based firms). Some observers of the US semiconductor industry are concerned about this migration as well as the loss of US commercial participation in certain SME segments. Disparities in application of export controls by the US relative to its Wassenaar partners is said to exacerbate the problem by restricting US industry in accessing rapidly growing Asian markets, without conferring any national security benefit, due to the ability of the Chinese to access comparable technologies from Europe and Japan. Semiconductor industry leaders have called on the US government to address these disparities as part of a broader effort to respond to purported unfair trade practices by foreign governments, organizations, or firms. This study found that, since the inception of Wassenaar, US-based IC, SME and materials companies have not been severely impacted by export controls, but this may not be the case going forward. US implementation of semiconductor export controls burdens US semiconductor companies with more conditions on foreign sales and longer and less predictable waiting periods for license approval than that faced by competitors in Europe or Japan selling comparable products, but licenses are rarely denied. Companies contacted by this study and published reports cite only a handful of instances where sales were lost to a foreign competitor due to delays or conditions in US export licensing. However, staffing requirements and the administrative burden of export controls represent a unilateral cost to US industry relative to its foreign competitors. The costs of compliance are rising and threaten to become a competitive disadvantage to US- based firms in the increasingly competitive international semiconductor industry. More importantly, licensing delays and uncertainties threaten to give US suppliers a reputation for being unreliable partners in the lean, “just in time,” worldwide supply chains that increasingly characterize high technology industries. Implementation of “deemed exports”—a license that must be obtained before providing to foreign nationals information related to controlled technologies—has led some companies to no longer hire 16 Chinese researchers and other controlled foreign nationals due to the risk and difficulty of complying with these regulations. Many of these talented individuals are doubtless hired by foreign competitors. As of this writing, unilateral costs to US-based semiconductor firms are relatively small in direct, quantitative terms. Qualitative factors—reputation for unreliability in supply, diversion of R&D funds to export control compliance, restricted access to foreign talent, barriers to developing a foothold in emerging markets such as China, etc.—are hard to assess but could soon be reflected in lost sales and competitiveness. Furthermore, certain prospective issues, if unaddressed, could lead to severe if not debilitating problems for the US semiconductor industry: o Proposed changes to Department of Commerce rules for dual use exports to China, if adopted, would cause currently decontrolled SME and materials to come under tighter scrutiny. The new rules would require US firms to confirm the commercial nature of customers and end users in China, with potentially severe penalties for exporting equipment or technology that was found to be supporting the production of Chinese military systems. For SME and materials companies, such verification could be impossible, since they produce general purpose equipment that could be used to build any type of ICs, which themselves are general purpose devices. (This problem could be mitigated by the “Validated End-User” provisions of the proposed rules— which would provide a blanket license for exports to certain foreign entities—though it is unclear how readily that designation will be given and how much of the export control burden it will relieve.) The ambiguity of the proposed rules confers potentially open-ended liability on US firms, based on subjective application by the Department of Commerce. This expansion of export documentation, investigation requirements for China, and potential liability would likely be unilateral, as other Wassenaar signatories have shown no interest in similarly tightening their implementation. o Continued unilateral application of deemed exports regulations could inhibit US companies in hiring top foreign talent from controlled countries, beyond the limitations imposed by immigration policy. In the case of China, this burden adds to the incentives for top Chinese technologists to stay in country or leave the US. This disadvantages US companies relative to foreign competitors, which do not face such hiring restrictions. Deemed export regulations could also inhibit US companies from performing joint research with leading Chinese institutes, some of which are approaching world-class standing in semiconductor technology. o The criteria for control of radiation hardened ICs in Category XV (d) of the ITAR could, within a few years, encompass most ICs and any electronics products incorporating them. This would make standard commercial ICs of all types subject to intensive control as “military items” regulated by the Department of State. The reason is that continuing miniaturization of IC circuits, introduction of low-power materials, new design techniques and improving error correction software are conferring inherent radiation hardness to all ICs—enough to possibly meet the ITAR criteria for being controlled, even if these ICs were not designed for use in nuclear or space systems and would be unreliable in such applications. Under ITAR’s “see through” rules any system containing a controlled part is considered a controlled item, which could lead to the perverse outcome of subjecting Japanese video games and European cell phones to US ITAR controls, which would effectively destroy the US IC export market. ITAR controls on ICs would doubtless be unilateral, as it is quite unlikely that the US would persuade foreign sources to treat all ICs as though they were weapons. In the final analysis, for such a dynamic and globally dispersed technology as microelectronics it is very difficult for any control regime to be effective. As the locus of advanced IC consumption and production moves to Asia, including China as well as Taiwan and Korea, the underlying rationale for controlling microelectronics technologies appears to be negated. Today US IC manufacturers are little affected by export controls, although they have to maintain the processes required by the government. What is worrisome is that in the near future there will be unintended consequences seriously impacting US IC manufacturers if either the China Catch-All comes into effect as proposed or if changes are not made to the ITAR RADHARD provisions. 18 C. MACHINE TOOL INDUSTRY The machine tool industry is interesting and important to an examination of the economic impacts of export control for three reasons: o Machine tools have traditionally been an important export control concern. The 1976 Bucy report 10 emphasized that controlling manufacturing technology (the ability to make weapons) is more important than controlling weapons system operational technology. Machine tools embody manufacturing technology. The 1987 Toshiba affair (in which several advanced machine tools were exported from Japan to the Soviet Union to manufacture propellers for submarines) and the 2003 Mitutoyo debacle (Japanese Mitutoyo exported coordinate measuring machines without a license and wound up in Libya helping to make uranium refining centrifuges) are among the most significant export control violations, and they both occurred within the machine tool industry. o Export control restrictions on machine tools have been significant and very consistent over the last half century, making the sector a good case for study of the long term impact of export controls on an industry. o Today, China is the largest buyer of machine tools in the world and is the country to which most machine tool export restrictions apply. China buys about one-quarter of the world’s tools. The current impact of export controls should be apparent here, if anywhere. Machine tools have been vital to the nation’s warfighting capability since the Civil War. Machine tools build the composite surfaces of modern aircraft, which confer light weight and, for military aircraft, stealth. Machine tools mill the titanium frames that 10 “In 1976 a Defense Science Board Task Force issued a report, commonly called the Bucy report [Defense Science Board Task Force on Export of U.S. Technology, An Analysis of Export Control of U.S. Technology--A DOD Perspective (Washington, D.C.: GPO, 1976)] suggesting that the export control system should shift from a focus on products to a focus on critical technology. Basically the Bucy task force argued that, with the exception of technologies of direct military value to potential adversaries, effort to control exports should not focus on the products of technology but on design and manufacturing know-how. The report recommended that primary emphasis should be placed on (1) arrays of design and manufacturing know-how; (2) ‘keystone’ manufacturing, inspection, and test equipment; and (3) products requiring sophisticated operation, application, or maintenance know-how. The Bucy task force concluded that the preservation of the US lead in critical technological areas was becoming increasingly difficult but could be achieved, first, by denying the exportation of technology.” p. 31, Scientific Communication and National Security, NRC Report (1982) by the Committee on Science, Engineering, and Public Policy of the National Academy of Sciences. 19 provide the structure for these same aircraft. Complex parts such as centrifugal compressors in turbine engines, and precision parts, such as germanium lenses in infrared vision systems, all depend on specialized high technology machine tools. Machine tools are a small industry: about $3 billion in tools are produced annually in the US. The US machine tool industry has shrunk from being the world leader in the 1950s and 1960s to being a second tier player today. The US now provides about 5% of the world’s machine tools. Leading countries are Japan, Germany, Italy, China, and Switzerland. US machine tool production capabilities today are on par with Taiwan and South Korea. Although export controls impact industry growth and health generally, the demise of the US machine tool industry was not caused by export controls—they were not even an important contributor to the prolonged contraction. The IDA study team found that export controls reduce the revenue of the US machine tool industry by 1% - 2%. (In addition, for companies that export, the process of screening customers and applying for licenses costs about 2% of revenue, although that percentage is substantially higher for some small firms.) To the extent that there is revenue loss, it is not due to prohibited sales. Instead, the losses are in sales to potentially licensable Chinese customers. These sales are being lost to European competitors whose export control processes are swifter and more dependable. In many European countries (particularly Germany, Switzerland, Italy and Spain), the manufacturer can obtain preliminary judgments from export control authorities that permit them to confidently guarantee a Chinese customer at the time of sale that an export license will be granted. For US firms, approval of a license to export to China is never certain in advance. Furthermore, license approval in the European countries requires only a few weeks, while in the US, licenses to China usually take months. Partly as a result, European manufacturers command a 30% to 100% price premium in China, the largest machine tool market in the world. The quantitative impact of export controls on US exports of machine tools to China was analyzed with a gravity model of international trade in machine tools. The gravity model predicts exports from one country to another solely based on the size of machine tool production in the exporting country, the size of machine tool consumption in the importing country, and the distance between the two countries. If there is an additional factor that strongly affects exports, such as export controls, it ought to appear as a discrepancy between actual exports and the exports predicted by the gravity model. 20 Figure 1 compares the gravity model with actual exports from the US to China. The line labeled “model” are predictions from the gravity model, based on machine tool production and consumption of the eight major exporting countries. The line labeled “data” is actual new machine tool exports from US to China (not including parts and service). Actual exports are not significantly depressed compared to the model, which suggests that export controls do not strongly impact the dollar volume of US machine tool exports to China. 0.25 Model Data 0 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 Figure 1. Gravity Model Comparison with Actual US Exports to China To confirm this result, Figure 2 looks at all exports of new machine tools to major consumer countries during the period of interest. Actual exports to Japan and Germany are significantly lower than gravity model predictions. This indicates that the US machine tool industry is being hurt by factors that restrict exports to Germany and Japan, but not particularly by export controls on exports to China. Several experts interviewed attributed the depression in exports to Germany to German nationalism. However, Italy and Japan export into Germany at approximately the rate projected by the gravity model, and Swiss exports to Germany are almost double the model predictions. These data suggests that the perceived quality of US machine tools is the factor that depresses exports to Germany and perhaps also to Japan. 21 Then year $ billions 0.2 US to China 0.2 US to Germany 0.1 0.1 Model Data Not so bad 00 US exports underperforming 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 US to Japan 0.1 00 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 0.1 US to South Korea 0.1 US to Switzerland 00 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 Figure 2. Gravity Model Analysis of US Exports to All Countries Despite the relatively small percentage of lost sales overall, the export advantage held by the Europeans in China is beginning to deeply hurt US machine tool producers in the most advanced segments of the industry. Most of the larger US machine tool firms are owned by multinational companies. Increasingly onerous US export controls to China is driving these multinationals to pull their technology development and product development investments out of the US and focus them in Europe, accelerating the technological decline of US machine tool technology relative to the rest of the world. Given that the ultimate goal of national security export controls is to preserve technology leadership in areas that materially contribute to military capabilities, they have completely failed in the machine tool sector. US leadership has been lost, perhaps irrevocably. Whether this is a crisis or not depends on whether, in today’s world, an indigenous capability to manufacture cutting edge technology tools is still a critical defense need. 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 US to Italy 0.1 22 Then year $ billions D. ADVANCED MATERIALS INDUSTRY Advanced materials encompass a variety of technologies and a diverse set of industries. This sector study focused on advanced composites which consist of high performance fiber reinforcements (carbon, glass or aramids) embedded within various material matrices (polymer, ceramic or metal). Advanced composites can be highly engineered for a host of divergent applications (often structural in nature) while providing remarkable properties superior to conventional materials (ultra lightweight, high strength and stiffness). Characteristics of these materials important to DoD include exceptional thermal protection, impact tolerance, electronic signature reduction and reduced fatigue while also enabling novel system-of-systems concepts such as the integration of electrical and mechanical technologies within conformable structures. This sector study further focused on carbon fiber reinforced, polymer matrix composites (CF-PMC) and their use in aerostructures applications since collectively this is the most prolific and important application of advanced composites to DoD. CF-PMCs support critical and large-scale defense systems such as aircraft, space vehicles, missiles and munitions, as well as emergent applications in future military ground vehicles and naval vessels. While other US advanced composites industries share similar challenges with export controls, the CF-PMC aerostructures industrial base is the most widely impacted. The specific foci of this sector study included CF-PMC feedstock material suppliers (e.g., fiber and prepreg producers), Tier I & II composite fabricators of aerostructures and major OEM integrators of commercial and military products and systems. Additionally, the study included manufacturers of automated CF-PMC processing machines and providers of industry specific professional services (technical and marketing). Worldwide revenues of the CF-PMC industry in 2005 was estimated at $27B for fabricated composites across three major market segments—industrial, aerospace-defense and consumer product (sporting goods) applications. Of this amount approximately $7B represents the value of aerospace and defense fabricated aerostructures. Approximately $1.5B of this amount is the size of international demand for aerospace and defense feedstock materials (i.e., fiber and prepreg). Most of the CF-PMC industrial base (feedstock, composite fabricators and product integrators) is evenly distributed between, the US and Europe. The US has historically maintained leadership in space and defense aerostructures as well as related fiber and prepreg materials. Europe has traditionally maintained prominence in composites fabrication of commercial aerostructures and industrial products as well as niche areas of various high temperature resins and complex 23 woven fiber performs. However, Japan is by far the world’s leader in carbon fiber production and an emerging supplier of leading-edge commercial aerostructures. Developing countries in Asia have long dominated composites fabrication of consumer sporting goods and play a growing role in manufacturing commercial aerostructures. Many of these industry leadership positions are regularly challenged and some are shifting due to a host of emerging globalization dynamics. The early-stage development of today’s CF-PMC aerostructures industrial base began in earnest during the late 1960s and early 70s and was led by DoD R&D investment in various aerospace and defense requirements. Subsequent technology maturation and transition throughout the 1980s and early 90s were fueled by DoD acquisition of military aircraft, ballistic missiles and satellites. At the height of the Cold War, DoD constituted nearly 50% of the US industrial base demand for CF-PMC’s core feedstock material (carbon fiber). However, the large-scale popularity of CF-PMCs for diverse civilian applications quickly soared and commercial uses (industrial products, consumer goods and civilian aerospace) soon outpaced DoD demand. By 1999 DoD carbon fiber use declined to 9% of US demand and 4% of global consumption. Key factors contributing to the commercial success include increasing manufacturing affordability of CF-PMCs, a proliferation of commercial applications worldwide, and concomitant rapid industrial base globalization of CF-PMCs. DoD has benefited from increased capacity, innovation, affordability and productivity due to the expanding, commercial industrial base. These dual-use industry dynamics are increasingly becoming conflicted with US export controls. The traditional notion of exports as foreign trade of physical products is being superseded by global supply chain enterprising, offshoring of manufacturing and R&D, export trade offsets (revenue-sharing), global teaming and joint ventures, foreign direct investment, licensing of intangible assets, etc. CF-PMC exports are regulated under both the Department of Commerce (DOC) via the CCL for dual-use goods and services and the Department of State under ITAR for highly sensitive materials for ablative, signature reduction, high temperature resistance and low coefficient of thermal expansion requirements. These controls regulate sales of CF-PMC feedstock materials, fabricated aerostructures, automated manufacturing equipment and technology “know-how,” encompassing expertise in CF-PMC development, manufacturing processes, products and applications. ITAR maintains virtually complete control over exports of fabricated CF- PMC aerostructures for military and space-based end-uses and retains very tight and 24 comprehensive control over CF-PMC know-how. DOS and DOC share control over various Missile Technology Control Regime (MTCR) items and technology. DOC control of feedstock material is largely based on the physical performance levels of materials (typically strength, modulus and temperature resistance). DOC controls also regulate trade in both advanced and less advanced, automated CF-PMC manufacturing equipment. Controls on the international exchange (export) of know-how can apply to almost any facet of CF-PMCs (i.e. from development to production to sustainment) while also applying to both controlled and uncontrolled materials. While DOC regulates a rather limited number of CF-PMC feedstock materials destined for foreign markets in developing regions of the world, little to no control exists for NATO countries and within other nations with close US security ties such as Australia, Japan and South Korea. Most grades of feedstock material can be exported to almost anywhere in the world without a license, and most US exports are uncontrolled materials. More than 80% of US exports are destined to markets in Europe and most exports to Europe of controlled (licensable) materials are granted license exceptions for both commercial and most defense related uses. As such, no widespread, demonstrable adverse impacts have been found due to Department of Commerce controls on exports of CF-PMC feedstock material. However, rising foreign demand for higher performing materials and the continued shift of industrial base supply chains to emerging markets (such as China, India, Brazil, and Russia) will likely result in greater control of feedstock materials. DOC controls on know-how, however, deeply penetrate CF-PMC firms’ global supply chain through control of technical exchanges between individuals and “stacks” of enterprise-level collaborations between material suppliers, composite fabricators, subassembly contractors, OEM integrators as well as providers of engineering, design, testing and R&D support. For an example, the Boeing 787 Dreamliner commercial aircraft incorporates record use of CF-PMCs (over 50% of structural weight) and will apply some of the most sophisticated approaches to composites manufacturing. In addition the Dreamliner is employing a radically new, internationally distributed, technology development and manufacturing supply chain business model. This will result in most of the fabrication for this aircraft being outsourced with a large portion of this subcontract work taking place in developing countries to satisfy export offset obligations (revenue-sharing) while maximizing OEM cost-reduction, profits and business risk sharing. Reportedly the Department of Commerce controls on know-how have increased supply chain costs, caused scheduling delays and diminished foreign teaming 25 opportunities with attendant costs estimated to be millions of dollars. Beyond disrupting such exchanges between suppliers and customers, deemed export regulations interfere with interactions between US and foreign employees of the same firm that might collaborate on manufacturing process improvements, business development and new product innovation within the US and at offshore manufacturing and service facilities. As described in the sector report on machine tools, DOC through the CCL tightly controls automated manufacturing equipment exports, inhibiting US firm presence in certain emerging high growth markets in less developed countries (China, India, Brazil, Malaysia). European competitors enjoy licensing advantages for machine sales to China, the fastest growing market. A recently approved license in Spain to export a tape laying machine to Harbin Aircraft in China (a manufacturer of aircraft for military and commercial uses) is cited as an example of Europe’s less stringent controls providing a competitive advantage. While automation equipment licenses are regularly granted for US exports to Europe, licensing conditions can be restrictive. For example, DOC will approve a machine export to a major European aerospace and defense firm, but prohibit the use of the US equipment for the development and manufacturing of certain aerospace and defense aerostructures (missiles, launch vehicles and unmanned aircraft). US OEMs believe their European counterparts are not similarly constrained. These equipment automation restrictions impact multiple tiers of US composite fabricators and domestic prime integrators who confront controls on machine process know-how when dealing with foreign firms in their supply chain thus disrupting globally distributed manufacturing enterprises. This further underscores an important emerging phenomenon in globalized competition: individual businesses are now competing at the global level of supply-chain-verses-supply-chain rather than competing simply at the local, firm-to-firm level. Unfortunately, in the CF-PMC arena the current controls on technological know- how impinge directly on the ability to form and maintain such globally dispersed supply chains. DOC’s proposed “China Catch-All,” if implemented, would further tighten CF- PMC controlled exports to China as well as extend control to previously unregulated exports. This new rule would broadly constrict trade with a leading world market, significantly raise business uncertainty and increase regulatory risks associated with increased exposure to elevated control demands. Given that leading competitors of US firms in Europe would not face similar constraints, unilateral implementation of this proposed rule change would place US firms at an increased disadvantage. 26 ITAR controls, while specific to a limited number of very specialized military- related materials, also entail industrial base dynamics that are largely similar to those described for the dual-use industry. Most of these exports are to established European markets, and most licenses are ultimately approved. As such, no demonstrable adverse impacts were identified due to ITAR’s denial of licenses of US CF-PMC feedstock for military specific aerostructures. However, the Department of State’s implementation processes for the review and approval of licenses is besieged with serious problems including substantial delays, inconsistencies in decision-making, intrusions into supplier-customer relationships, and lack of process visibility, efficiency and accountability. These mounting problems in ITAR’s implementation could reduce US leadership in European defense markets through European integrators designing out US ITAR products and providing incentives for the formation of non-US competitors. ITAR also imposes pervasive controls on technology know-how (i.e. TAAs and MLAs), impacting not only defense firms abroad and foreign defense ministries of close US allies but also directly affecting ongoing DoD military aircraft production (UH-60 Black Hawk), development of future combat systems (F-35 Lightning II) and associated export trade offset ventures. Various manufacturing, and development programs, have experienced scheduling delays, significant increases in costs and impediments to innovation of importance to DoD. Industry reports that millions of dollars of added supply chain costs result from these controls. ITAR is increasingly impacting commercial aircraft production, due to “tainting” of CF-PMC aerostructures. Decades old legacy technology originally developed by industry with DoD funding and (or) qualification testing for a former defense program are typically considered ITAR classified (tainted). The added costs of industry “fire walls” and requalification of legacy ITAR technology for future commercial uses are measured in the tens of millions of dollars. Not only does this conflict with the fundamental business case for advancing a dual-use industrial base for the ultimate benefit of DoD and the civilian economy, but ITAR tainting can retard the continued technology maturation and future evolution of earlier R&D investments. For example, ITAR tainting impacted DoD’s recently concluded $150M Composites Affordability Initiative (CAI), in which private industry contributed 50% of the cost. The commercial aircraft industry is reluctant to commercialize CAI technologies because of ITAR tainting as major aircraft OEMs prohibit use of such tainted technologies in their products. Thus, DoD and US industry are not fully utilizing CAI’s CF-PMC investments for either military or commercial applications.

#### Public universities are key – provide partnerships with industries that spur research in semiconductors

Rhoten and Powell 11 [Diana Rhoten, Walter Powell “Public Research Universities ten From Land Grant to Federal Grant to Patent Grant Institutions” in Knowledge Matters: The Public Mission of the Research University, Eds Diana Rhoten and Craig Calhoun 2011] AT

Shortly thereafter, as government interests shifted from sponsoring basic research justified by national concerns to promoting applied research targeting global competition, a series of new federal legislative initiatives emerged. The earliest and most commonly cited is the Bayh-Dole Act of 1980, which transferred the rights of ownership of federally funded inventions from the government to the recipient of the federal funds.14 As a virtual equivalent of the transfer of land grant rights under the Morrill Act, the Bayh-Dole Act turned over intellectual property rights emanating from federally funded research to all universities. With a growing family of policies behind it—including the StevensonWydler Technology Innovation Act of 1980, the Economic Recovery Tax Act of 1981, the Small Business Innovation Research Act of 1982, the National Cooperative Research Act of 1984, and judicial decisions granting expansive rights to intellectual property claims—Bayh-Dole sent a clear and concerted signal for universities to promote technology transfer and pursue property rights. While prompted by economic concerns and facilitated by legal regimes, the incorporation of such commercial and entrepreneurial activities into the university also was accelerated by technological change and the rise of venture capital financing, particularly in the areas of biomedical and computer science.15 Under these new conditions—which essentially underpin the global knowledge economy—universities moved away from older models of practice in which the university pushed publicly funded research out to industry toward newer models in which scientists collaborated with industry on publicly and privately supported research. In an array of technologically sophisticated sectors, from biotechnology to semiconductors, design and apparel, and telecommunications, a dense web of affiliations between universities and commercial firms were spawned.16 To be sure, such relationships are not entirely new. The assumptions and actions surrounding them, however, are different in subtle but potentially significant ways, which can place such activities at odds with the historical myths and missions of the public research university. University technology transfer has prompted an array of new metrics by which universities are evaluated. The generation of licensing income is one. For public universities, the number of spin-off companies is regarded as a contribution to local economic development. Likewise, some universities underscore patenting as a measure of their contribution to commercial science. These new metrics of accomplishment trigger novel forms of competition among universities and generate new criteria by which universities are assessed.17 State legislators are much more prone to ask public universities whether they are having an impact on job creation and employment growth in their communities. Indeed, some states tie funding to these goals and allocate resources to commercial engagement. Thus, the embrace of technology transfer has altered the way in which universities are regarded by various key constituencies, and the creation of measures of entrepreneurial accomplishment has led to more intensive efforts inside universities to manage and publicize such activities. Critics, ranging from those who allege the corporate capture of universities to others who contend that bureaucracy and public relations deter the actual transfer and application of knowledge, note that this new regime can conflict with long-standing goals of knowledge production and teaching.18 In sum, the missions of the American public research university have shifted over the last 150 years, imbuing the institution with multiple myths and endowing it with different models from one period to the next. As a land grant institution, the public research university was in many ways the “local servant” responsible for homesteading a new field of higher education, democratizing teaching and learning, conducting mission-oriented research, and rendering services directly to local communities and citizens. This nineteenth-century ideal of the public research university was captured in the “Wisconsin Idea,” which, as expressed by the then president of the University of Wisconsin, states that the public university should “never be content until the beneficent influence of the university reaches every family in the state.”19 As a federal grant institution, the public research university took on more of a “national scholar” persona. In this role, the public research university graduated from a set of loosely connected pioneering organizations to a federated system of professional organizations responsible for integrating research with teaching, supplying rigorous basic science for industrial innovation, and leveraging its well-resourced base to advance the country socially and economically. This view of the twentieth-century public research university was best encapsulated in the “Social Contract for Science,” which embodied the expectation that in exchange for the government’s investments, universities would produce public good research that served the nation’s interests and solved its ills.20 As a patent grant institution, the public research university assumed yet another identity, that of the “international salesman” responsible for taking knowledge products directly from laboratory to the market, reinvesting earnings to enhance prestige and reputation, and carrying the country forward into a globally competitive knowledge economy. Michael Crow, president of Arizona State University, best summarized this vision for the twenty-first-century public university: “The modern university is the ideal environment for the creation and transfer of knowledge that drives national competitiveness in an increasingly global era.”21

#### Absent semiconductors, net-centric warfare transition fails

Harada 10—United States Army Reserve [Colonel Lawrence K. Harada, “Semiconductor Technology and U.S. National Security”, U.S. Army War College Research Paper, 4-21, http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA526581 &Location=U2&doc=GetTRDoc.pdf]

Semiconductor technologies that support U.S. national security also fuel the much larger worldwide economy. As a result, most semiconductor technologies for leading edge military applications arise from the commercial industry and not the military sector.20 The importance of semiconductor technology to U.S. national security cannot be understated. Largely ignored as the intelligence inside U.S. military weapon systems, semiconductor technologies ―provide the force multipliers that made the revolution in military affairs possible. 21 In Joint Vision 2020, semiconductor technology is the implied driver of the military transformation that will enhance the capabilities and the―revolution of joint command and control. 22 As the U.S. military moves to a network-centric force, the demands for extremely fast microchips will increase. DOD’s Global Information Grid (GIG) requires high-speed connectivity, encryption, and decryption to support both weapon platforms and the soldier on the battlefield.23 The ability to sustain and even surpass these high-speed requirements rests with the U.S. semiconductor industry. Unfortunately, the PRC will be in a better position than the U.S. to manufacture the next several generations of microchips. This reversal of fortune is not by happenstance. As part of its strategic plan, China declared in 2000 with a ―5 to 10 years’ effort…. Domestic integrated circuit products will also satisfy most domestic demand and be exported as well while reducing the development and production technology gap with developed countries. 24 Today, China is on path to exceed this objective. With financial incentives from their government, Chinese semiconductor manufacturers have an advantage over U.S. chipmakers. China’s investment in semiconductor technologies is impressive. China will likely invest over $US 20 billion over the next five years in all semiconductor technologies.25 This funding provides Chinese semiconductor manufacturers the necessary capital to build several state-of-art fabs and the capability to design leading edge chips. 26 China’s incentives range from 5-year tax holidays to accelerated depreciation on equipment.27 U.S. semiconductor manufacturers and industry consortia have requested the government for financial support to counter China’s incentives that lure foreign investment to the PRC.

#### NCW is the ultimate deterrent to all conflict – solves extinction

Nam 5—professor of Inha University, South Korea, formerly worked for the Korea Institute for Defense Analysis [Chang-Hee Nam, “The Realignment of the USFK in the Military Transformation and South Korea's Defense Reform 2020”, <http://www.nids.go.jp/english/event/symposium/pdf/2005/e2005_05.pdf>]

By contrast with the LPP, the relocation of the 2 nd Infantry Division to the OsanPyeongtaek area has more to do with a fundamental change in the Pentagon’s global strategy. The foremost locomotive behind the structural realignment of the USFK comes from Secretary Rumsfeld’s military transformation initiative, which gained more salience in the Pentagon’s war on terrorism after the September 11 attacks. Secretary of Defense Rumsfeld strongly argues that the U.S. military should adapt to new threats coming from terrorist groups who might use weapons of mass destruction. He believes that the old-fashioned basing of the U.S. forces during the Cold War-era has now become obsolete and can no longer help defend American interests from attacks in unexpected times and places. He contends, “The Pentagon decided to move away from the old ‘threat-based’ strategy that had dominated our country’s defense planning for the early half a century and adopt a new ‘capabilities-based’ approach -- one that focuses less on who might threaten us, or where, and more on how we might be threatened and what is needed to deter and defend against such threats.” 4 The disastrous damage inflicted on Americans by the unprecedented attacks of September 11 awakened the American military thinkers to devise genuinely new ways of thinking. The White House hinted that America now needs a so-called third round of transformation in constructing its national security strategy -- as it did after the British invasion of the early 19 th century and at the advent of the Cold War. 5 The U.S. military now needs to reconfigure its military machine to be able to deal with elusive enemies whose activities are small in size, transnational and ubiquitous. The proponents of Revolution in Military Affairs (RMA) in the American military provided a timely solution for adapting to the new types of threats. Notably, the RMA refers to a fundamental transformation in military strategy and operations that transpired in the process of amplifying combat effectiveness by linking Intelligence, Surveillance and Reconnaissance (ISR) and Precision Guided Munitions (PGMS) with highly sophisticated C4I (Command and Control, Communication, Computer and Intelligence). This network-centric system-of-systems, which gathers accurate information through sophisticated battlefield awareness capabilities, relaying it to the shooter, has been proving its effectiveness in the most recent U.S.-led wars. Arthur Cebrowski, a retired admiral and a former Director of the Office of Force Transformation in the Pentagon, came up with the new concept of “Network-Centric Warfare (NCW).” Cebrowski’s men suggested a network-centric warfare for dramatically amplified war fighting effectiveness, which could be applied to suffocating by maximum vigilance of the terrorist groups to neutralization. A global network of real-time sensor-shooter linkage supported by agile and mobile forces dispersed around key nodes would successfully discourage any country to allow a haven for terrorist groups. “Network-centric warfare is characterized by the ability of geographically dispersed forces to attain a high level of shared battle-space awareness that is exploited to achieve massed effects swiftly without the physical massing of forces required in the past.” 6 This global rapid response system necessitates the reduction and relocation of forces still surrounding the Russian Federation following the old containment strategy. The Pentagon needed to find relevant force projection space to replace that of the past in its reconfiguration of the U.S. ground forces stationed around the globe. In the eyes of the Pentagon’s transformation planners, large contingents of U.S. ground forces on the Korean peninsula, equipped with heavily armored vehicles, impeding mobility, look somewhat outdated and less adaptable to the requirements of new missions in America’s war on terrorism. Other encouraging changes include enhanced lift capabilities and improved deployability of Rapid Deployment Forces (RDF). Transport aircraft like the C-17 now allow for rapid airlift of soldiers and even armored vehicles, reducing the need for advance deployment of large-scale ground forces. The Stryker Brigade Combat Team (SBCT), a crucial component of the Army’s multifunctional Unit of Action (UA) under future chain of command such as UEx and UEy, will replace the army brigades. The future combat team of light infantry troops can be dispatched together with light armored vehicles to any part of the world. This attests to the desire of the U.S. Department of Defense for a global basing system that would reshape U.S. troops overseas to be smaller, modular, mobile, and thus adaptable to carrying out network-centric warfare against scattered and invisible enemies. Rumsfeld has specially emphasized speed, noting that, “In order to defend the American cities, allies, and deployed forces the United States is required to have rapidly deployable, fully-integrated, forces capable of reaching distant theaters quickly and working with air and sea forces to strike adversaries swiftly and with devastating effect.” 7 Accordingly, the Pentagon’s Office of Force Transformation laid out their requirements in the Global Defense Posture Review (GPR), noting that only forces oriented around “speed” are able to define or alter the initial conditions on terms favorable to the U.S. interests, effectively dissuading and defeating asymmetric threats of non-state adversaries. 8 Their report again proudly states, “The U.S. military is developing an enhanced forward deterrent posture through the integration of new combinations of immediately employable, forward stationed and deployed forces; globally available reconnaissance, strike, and command and control (C2) assets; information operations capabilities; and rapidly deployable, highly lethal, and sustainable forces that may come from outside a theater of operations.” 9 According to the transformation research team, ubiquitous, seamlessly joint, and virtually omniscient forces with capabilities for overcoming distance are expected to effectively break the will or otherwise shape the behavior of the elusive enemy. 10 Allowing no safe, hardened sanctuary anywhere in the globe, the potential adversary would no longer retain the will to fight, or would be so disoriented that they can no longer fight or react coherently. 11

### 1AC – Solvency

#### Public colleges and universities ought not prohibit the constitutionally protected dissemination of information.

#### The right to access information – and, consequently, science research – is protected by the First Amendment

Ram 17 [Natalie Ram (Assistant Professor, University of Baltimore School of Law), "Science as Speech," Iowa Law Review, 2017] AZ

Constitutional scholars have devoted extensive time and energy to identifying the values underlying the First Amendment’s Free Speech Clause. Under some theories, the ability of listeners to access information is of utmost importance,55 while participation in meaning-making is most closely valued under others.56 Across these theories, however, runs a common concern: preventing the State from skewing the range of knowledge available to consider, try on, or build upon. In turn, as set forth below, these theories evince a concern about government interference with knowledge production. Such a concern is readily apparent in both the self-governance and truthseeking theories of the First Amendment. Under the self-governance theory, Alexander Meiklejohn described the First Amendment as insurance “that no suggestion of policy shall be denied a hearing because it is on one side of the issue rather than another,” and not as “the guardian of unregulated talkativeness.”57 Under the truth-seeking theory, all ideas outside of low speech categories58 are equally protected because “[a]n individual who seeks knowledge and truth must hear all sides of the question, consider all alternatives, test his judgment by exposing it to opposition, and make full use of different minds.”59 The central concern of the pursuit-of-truth understanding of the First Amendment, as in the self-governance theory, is for the ideas expressed rather than a particular speaker’s ability to speak. The principal instinct in both the truth-seeking and self-governance theories suggest that the First Amendment is concerned primarily with facilitating knowledge formation and exchange. Building from this foundation, the First Amendment must also be concerned with the production of ideas and information. James Madison recognized the connection between an informed public and one able to pursue the production of information, writing, “[a] popular Government, without popular information, or the means of acquiring it, is but a Prologue to a Farce or a Tragedy; or perhaps both.”60 Just as the First Amendment constrains the State in closing down sectors of debate simply because the State does not like the ideas involved, the First Amendment must likewise constrain (to some degree) the State’s authority to suppress activities that generate ideas and knowledge in the first place. If this were not so, then the State would be free to shape and control the cacophony within the public sphere of free expression in impermissible ways by selectively suppressing the production of knowledge about certain subjects and ideas. Concern for knowledge production is similarly at the core of other prominent First Amendment theories. Under Seana Valentine Shiffrin’s thinker-based approach, free speech theory “takes to be central the individual agent’s interest in the protection of the free development and operation of her mind.”61 In articulating the scope of what triggers First Amendment scrutiny pursuant to the thinker-based approach, Shiffrin identifies knowledge production. She explains that government regulation may run afoul for the thinker-based approach when, among other things, it “ban[s] or attempt[s] to ban the free development and operation of a person’s mind or those activities or materials necessary for its free development and operation.”62 In other words, government regulation implicates the First Amendment where it interferes with activities that give rise to the free development and operation of the mind. Moreover, Shiffrin explains that speech is especially important and worthy of constitutional protection because it has the capacity to be “exploratory[,] to allow us in a non-committal way to try on an idea.”63 This description of the importance of speech reflects the importance of knowledge production in two ways. First, that if there may be regulation of knowledge produced, there will be a skewed universe of ideas to “try on.” Second, that scientific experimentation, more specifically, may itself be described in much the same way Shiffrin describes speech—as “exploratory” and a way to test an idea.64 Similarly, those who link the First Amendment to democratic culture and the information society recognize the central role of knowledge production and access to knowledge. Jack Balkin argues that “[t]he purpose of freedom of speech . . . is to promote a democratic culture” that “allows ordinary people to participate freely in the spread of ideas and in the creation of meanings that, in turn, help constitute them as persons.”65 Balkin explains that “[i]n a democratic culture people are free to appropriate elements of culture that lay to hand, criticize them, build upon them, and create something new that is added to the mix of culture and its resources.”66 He emphasizes “each individual’s ability to participate in the production and distribution of culture.”67 Indeed, much of Balkin’s theory of democratic culture focuses on “production” and “creation”—acts that cohere with a First Amendment drive toward knowledge production. Under this approach, Balkin criticizes state regulations that target “party A in order to control speaker B.”68 Collateral censorship of this kind similarly arises in the context of knowledgeproduction regulation more broadly, wherein the State restricts individuals engaged in knowledge production in order to prevent certain knowledge from becoming available for debate and discussion. In both instances, the State targets a non-traditional actor in order to suppress related First Amendment activity. Viewing the First Amendment as essential to a democratic culture once again necessitates First Amendment attention to government regulation of knowledge production itself. Finally, characterizing the First Amendment as concerned with knowledge production also brings it into harmony, rather than tension, with the Progress Clause. The Supreme Court has observed, “[t]he [Progress] Clause and First Amendment were adopted close in time. This proximity indicates that, in the Framers’ view, copyright’s limited monopolies are compatible with free speech principles.”69 As discussed above, the “Science” identified in the Progress Clause “was used to denote any branch of organized or demonstrated knowledge.”70 Thus, the Framers of the Constitution intended the Progress Clause to promote knowledge production broadly. A First Amendment that is likewise protective of knowledge producing activities is most appropriate theoretically, historically, and doctrinally. In sum, knowledge production generally embodies deep principles and values of First Amendment theory. Under a number of theories about the guiding principles of the Free Speech Clause, a concern for knowledge production is essential. The ability to speak or listen to all ideas or viewpoints—activities that the First Amendment strongly protects—is of little meaning if the State can simply prevent people from ever discovering certain kinds of knowledge. B. SCIENCE AND THE MODES OF KNOWLEDGE PRODUCTION Scientific experimentation is one of the primary means by which people develop new knowledge. There are three readily identifiable modes of producing knowledge, two of which already receive strong First Amendment protection: philosophy (knowledge production by dialectic) and art (knowledge production through expression). Science, or knowledge production through experimentation guided by empirical methodologies, deserves similar constitutional attention. Philosophy and the liberal arts are notable knowledge-production engines because they rely on processes of dialectic, analysis, and reason to arrive at novel conclusions or conjectures. Philosophy is presently protected under the First Amendment on theories of protection for communicative acts as well as for “individual freedom of mind.”71 As set forth above, the freedom to think is indispensable to discovering new ideas and information, and the knowledge generated in dialectic exchange is a core First Amendment concern.72 Accordingly, philosophy and the liberal arts merit First Amendment protection because they are primary modes of knowledge production. Indeed, courts frequently act in accord with the knowledgeproduction rationale in their holdings, if not in their explicit reasoning.73 Art, like philosophy, not only introduces and expresses new ideas, but it can also trigger, result from, or represent new ways of thinking about the world. Art can provoke intense discussion, make a statement, or challenge norms and the status quo.74 Visual art is generally deemed protected expression under the First Amendment.75 Because of its ability to communicate directly, courts recognize that art falls within the scope of “speech” that is the forefront of First Amendment protection.76 Insofar as art produces knowledge, however, it should likewise trigger First Amendment scrutiny. Finally, science represents one of the primary ways in which people produce knowledge. CRISPR/Cas9 and SCNT technology, among other scientific advances, introduced new knowledge about our genetic heritage and how it may be manipulated; they also raise profound questions about what it is to be human and a morally relevant member of the human community.77 Similarly, research investigating what made the 1918 flu so virulent allayed some scientific and public health concerns about recurrence of that virus, while also raising fears that the results of such research might be misused to create new pathogens.78 To say that the knowledge produced through science can change the way in which we see the world and ourselves in it is an understatement. After all, Nicolaus Copernicus challenged centuries of settled “truth” by radically suggesting that the Sun, and not the Earth, was the center of the solar system.79 Charles Darwin challenged humanity’s superiority to other animals by suggesting a close relationship between man and other apes.80 Albert Einstein revolutionized physics and our understanding of the universe through his theory on relativity.81 James Watson and Francis Crick cracked the riddle of DNA and put biology and biotechnology into common knowledge.82 That science may draw political fire is likewise apparent. The most recent U.S. presidential election cycle featured a candidate campaigning on the blunt statement, “I believe in science.”83 Nor is such controversy a recent phenomenon. Galileo Galilei faced the Inquisition over his embrace of the Copernican solar system and his own research stemming from it.84 Darwin’s work continues to reverberate in many spheres, leading to political strife and political capital.85 It was at Einstein’s urging that President Theodore Roosevelt authorized the Manhattan Project, which created the atom bomb.86 And Ian Wilmut’s work on SCNT87 triggered worldwide outcry because cloning, if applied to humans, threatened to undermine what it means to be human. Human reproductive cloning, after all, “forces us to rethink in the most basic way the meaning of individuality, personal identity, family, and reproductive liberty. These concepts are well-formed at their core, but they blur at the margins.”88 If regulating scientific experimentation fell entirely outside the scope of the First Amendment, then much of the information that informs new understandings of the world, much less understandings of policy proposals in the United States, would be in jeopardy. Science tends to shake things up and to undermine long-held assumptions. In many cases, the knowledge produced through science can seem politically threatening to those in power. Germline gene editing, like human cloning, may destabilize traditional notions surrounding “individuality, personal identity, family, and reproductive liberty” by potentially putting tremendous power to shape future generations gene by gene in the control of reproducing (or cloning) individuals.89 Beyond the biological sciences, research on gun violence might yield data supporting open-carry legislation as a means to save lives—or it might show that such legislation increases, rather than decreases, gun violence and gun deaths.90 The power to exclude unfavorable or disliked information from the public sphere of free expression by prohibiting experimentation aimed at its discovery would vest extraordinary power in the hands of government to shape the content of public discourse. This means that a First Amendment concerned with protecting the production of knowledge must protect in some measure science from undue regulation.

#### Government restrictions on fundamental research at universities threatens American tech leadership – rejecting grants with these strings attached would promote openness

NRC 07 [(National Research Council (US) Committee on a New Government-University Partnership for Science and Security) Science And Security In A Post 9/11 World: A Report Based On Regional Discussions Between The Science And Security Communities, NCBI Bookshelf 2007] AT

According to the directive, fundamental research is defined as “basic and applied research in science and engineering, the results of which ordinarily are published and shared broadly within the scientific community, as distinguished from proprietary research and from industrial development, design, production, and product utilization, the results of which ordinarily are restricted for proprietary or national security reasons.”14 NSDD-189 is still in effect more than 20 years later. However, since September 11, 2001, there has been increased concern in the academic community that its spirit and intent could, and perhaps have begun to erode as security concerns increase. At the committee’s first regional meeting in May 2006, Professor Richard K. Lester, Professor and Director of Industrial Performance Center, the Massachusetts Institute of Technology (MIT), summarized the tensions between openness and security: The fact that universities and businesses need the free flow of ideas and knowledge while government needs to keep its citizens safe and to prevent weapons or knowledge of how to make weapons from falling into the hands of the wrong people, these differences and the tensions that are implicit in these differences are likely to grow more rather than less pronounced as time goes on. We must assume that the security imperatives of the government will become more challenging rather than less over the coming years and decades, and at the same time it seems likely that the importance of the university's role as a public space in an increasingly globalized innovation process will also grow.15 In the months following the September 11 attacks, the Bush administration reaffirmed the intent of NSDD-189. The then Assistant to the President for National Security Affairs, Condoleezza Rice, confirmed that “the policy on the transfer of scientific, technical, and engineering information set forth in NSDD-189 shall remain in effect, and we will ensure that this policy is followed.”16 NSDD-189’s application to fundamental research conducted in U.S. universities cannot be overemphasized. Both the Export Administration Regulations (EAR) of the Department of Commerce and the Department of State’s International Traffic in Arms Regulations (ITAR) acknowledge that NSDD-189 language provides an exclusion for certain research activities at colleges and universities in the United States from the application of the export regulations, provided that the institution does not accept restrictions (publication or access dissemination) that nullify the exclusion itself. Nonetheless, concerned about an erosion of the protections to fundamental research offered by NSDD-189, in 2002 the presidents of the National Academies issued a statement calling upon the government to affirm and maintain the general principle of NSDD-189: A successful balance between these two needs—security and openness—demands clarity in the distinctions between classified and unclassified research. We believe it to be essential that these distinctions not include poorly defined categories of ‘sensitive but unclassified’ information that do not provide precise guidance on what information should be restricted from public access. Experience shows that vague criteria of this kind generate deep uncertainties among both scientists and officials responsible for enforcing regulations. The inevitable effect is to stifle scientific creativity and to weaken national security.17 The directive does not assert that the open dissemination of unclassified research is without risk. Rather, it asserts that openness in research is so important to security and other key national objectives that it warrants the risk that our adversaries may benefit from scientific openness as well. In June 2005, the Center for Strategic and International Studies (CSIS) issued a report stating that NSDD-189 remains “the central principle governing security controls over fundamental research.”18 It also cited growing concerns about the effects of classification trends on fundamental research and the growing requirements for “deemed exports” (see discussion below). CSIS warned that the creeping nature of these controls creates ambiguity, results in discrimination, and creates delays and inflexibility that can hinder discoveries and scare away talent. The CSIS report noted that the security benefits of such policies are modest when weighed against the risks of such policies to U.S. technological leadership. Many university officials who spoke to the committee during its regional meetings shared the same sentiments. They reported that their previous reliance on NSDD-189 to exempt unclassified research from controls is being eroded due to a growing tendency to label research as “sensitive but unclassified (SBU)” and thereby to require restrictions on publication and sharing. In addition, they cited concerns about moves to increase the scope of “deemed export controls,” in the context of research conducted by foreign nationals in the United States (see further discussion below). It is not only that labeling research as “sensitive” can imply restrictions on publication and sharing, but there also is the converse problem that restrictions on sharing, for example, the requirement that a publication be reviewed by a sponsor prior to sharing with others, can cause the research to lose its status as “fundamental research.” It may then be ineligible for the fundamental research exclusion in export control regulations and thus de facto require an export license. In the regional meeting, some participants pointed out that universities are among a few limited institutions where one can openly conduct fundamental research that has potential implications for national security and that also has great potential for societal benefits. (See Box 2B.) In addition, the increasingly blurred distinction between fundamental and more applied research (particularly in the field of biology) makes for uncertainty in trying to draw a bright line between research that is subject to controls and that which is not. Stanford University President John L. Hennessy warned the committee that “Restricting access to projects or access to information is fundamentally antithetical to how we work. Although there are cases where limited access to sensitive information is needed and that information can be encapsulated without further damaging the nature of the research, such situations are not the norm and cannot become commonplace.”19 Several who participated in the committee’s regional meetings called for a reaffirmation of the intent of NSDD-189, so that all fundamental research at U.S. universities can be free from any publication restrictions. Such a reaffirmation would provide a clear recognition that academic freedom strengthens the nation’s security and also advances its competitiveness and economic well-being. The committee heard that in recent years some universities have been able to work with contracting personnel at federal agencies to recognize the difference in a research contract between basic and applied (in export terms “fundamental”) research conducted at a university versus the proprietary work done by an industrial partner (which is not able to rely on NSDD-189). Occasionally, sponsors have structured awards to recognize that difference. Often these contracts are delayed or complicated by restrictions that are inappropriate for university research. Through terms and conditions of unclassified research awards, particularly subawards from for-profit entities, universities are being asked by some federal funding agencies to accept restrictions on fundamental research. Although there have been instances of the inclusion of publication and access restrictions in assistance awards (grants and cooperative agreements), the committee heard that the far greater problem for universities is in the procurement (contracts) area. Contracting officers and universities sometimes do not recognize that the fundamental principles, as well as much of the wording of NSDD-189, are incorporated into the Federal Acquisition Regulations (FAR). The problem for universities is that federal agencies sometimes impose restrictions on publications or foreign nationals in their research contracts with universities when the research complies with the requirements of NSDD-189. More difficult for universities is the fact that federal agencies award research contracts to industrial firms without the fundamental research exclusion (which is appropriate) but do not consider that the subrecipient who will help perform the work may be a university for which the restrictions are not appropriate. The industrial prime may be reluctant (or unable) to secure sponsor approval to remove the requirement from their subcontracts to universities. One speaker informed the committee of a basic research contract in the aerospace domain that was refused when a small company attempted to challenge the flow-down of restrictive contract language appropriate for its portion of the work but not for the open research to be conducted at the university. The government agency responsible refused to make the changes despite persistent efforts by the prime contractor.20 Furthermore, in addition to recognizing that NSDD-189 is incorporated into the FAR, it is important that federal regulations such as the EAR and the ITAR be made consistent with NSDD-189. The recent recommendation of the Department of Commerce’s Inspector General’s (IG’s) office concerning a distinction between the conduct and results of research illustrates the inconsistency. Given these concerns, the committee offered the following recommendations: Recommendation 1 : Federal research funding agencies should ensure that grants and contracts for fundamental research awarded to institutions of higher learning in the United States abide by the principles of NSDD-189. Instructions and guidance for how to express these principles should be incorporated into each agency’s contracting and granting procedures in a more uniform manner. In addition, the requirement for adherence to the principles of NSDD-189 as stated in FAR 27.404(g)(2) should be incorporated into all research contracts to universities for basic and applied research in science and engineering. Recommendation 2 : Federal funding agencies should make clear to industrial awardees that the restrictive publication and foreign national clauses placed in government awards that would not apply to universities should not be passed down to university subawardees conducting fundamental research. In cases where the content of the subaward is known in advance, government contracting officers should include the appropriate provision in the original award. When the content of the university subaward is not known in advance, agencies should state that industrial prime contractors do not need agency permission to remove the restrictive clauses from subawards to universities. In addition, federal contracting officers should incorporate the provisions of FAR 27.404(g)(2) in all research contracts to universities where applicable and instruct industrial awardees that this clause is the appropriate clause to include in subawards to universities. Go to: Classification and Sensitive But Unclassified Classification of information is one means by which the government controls access to information. “With rare exceptions, only information that is owned by, produced by or for, or is under the control of the U.S. government is eligible to be classified.”21 In 1997, the “Moynihan Commission” found that roughly 3 million people in the United States had the ability to classify information.22 During this committee’s meetings, university officials reported that they had significant concerns about not only the increase in the types of research considered classified but also in the variability within and among agencies in classification policies and practices. A participant at the May 2006 regional meeting noted the tendency for over reaching on classifications: I used to do declassifications as a GS-9 in the Pentagon, and no one ever got promoted for giving away information. The only safe thing to do as a junior person in the bureaucracy is to make sure you never let anything out of the bag you shouldn't. So you are always going to say no and err on the side of caution. There needs to be a higher level place where … supervision can kick in and free up the information.23 Most universities do not pursue classified research on campus because of concerns that restrictions placed upon facilities, access, and participation are counter to the free flow of individuals and information that is typical of the university setting.24 As more research is considered classified, the disadvantages of excluded or exclusive research becomes greater. Stanford President John L. Hennessy noted: … our ability within the university to monitor access and information flow is limited. We could find ourselves either rejecting outright potential research grants or research directions that required such restrictions or placing them in separate wholly contained units that essentially segregate them from the rest of the university. This would, of course, end up in a situation where we segregate the participants and create what is essentially a different unit.25 Nonetheless, a small number of universities have been willing to accept classified research on campus. The committee heard that “at Georgia Tech we have no policies that prohibit faculty members or students from engaging in any kind of research they want to pursue,”26 and Georgia Tech has established a program whereby classified research can be carried out on campus. In particular, however, concerns were expressed that inconsistent and arbitrary use of the “sensitive but unclassified,” designation may be eroding some of the freedoms spelled out in NSDD-189. Research administrators attending the committee’s regional meetings described the difficulty of anticipating and implementing the requirements for SBU information and recommended that SBU should be largely (if not fully) eliminated. Many commented that if something affects national security it should be classified. Stanford University President John L. Hennessy asserted, “From the university’s perspective, restrictions on access to information are best delineated by clear boundaries such as the one created by classification or by outright restrictions on entry to the United States for individuals that pose a threat to our country.” Many speakers presented the view that the U.S. should do an effective review of an individual at the point of determining whether to issue a visa. Once a visa has been granted, individuals should be accorded the same opportunities for study and research as U.S.-born students. Universities and their faculty and staff must be vigilant about reporting unusual behavior of any student, foreign or U.S.-born. Other meeting participants expressed concern about the disparate and at times seemingly liberal use of the SBU designation across agencies noting that DHS is considering developing a policy definition of SBU research conducted at DHS-funded university-based centers of excellence that is contrary to the principles of NSDD-189. At the June 2006 regional meeting, Wayne Clough, President of the Georgia Institute of Technology, summarized the dilemma: What it boils down to is that we have no consistent policy. This is one of the problems that we have; we don't know which answer is the one we should use. What the Department of Energy finds acceptable today, the Department of Homeland Security may reject tomorrow. What NSF considers legitimate may be unacceptable to the Department of Defense.27 The use of SBU is particularly troubling because it has no single definition. Indeed, a 2006 GAO report found that federal agencies use 56 different designations for information that has been determined to be SBU.28 Further, the report found that there are no government-wide policies or procedures detailing how an agency should designate and handle SBU research. Consequently, inconsistent and contradictory policies can be found throughout the government. The arbritrariness of this designation means that research universities must contend with unclear definitions and variability in policy from agency to agency. In an attempt to improve the government’s sharing of information, in December 2005, the President issued “Guidelines and Requirements in Support of the Information Sharing Environment," which included a Guideline entitled “Standard Procedures for SBU.” The President’s memo called on agencies to develop standard procedures for handling SBU information. "To promote and enhance the effective and efficient acquisition, access, retention, production, use, management, and sharing of Sensitive But Unclassified (SBU) information, including homeland security information, law enforcement information, and terrorism information, procedures and standards for designating, marking, and handling SBU information must be standardized across the Federal Government."29 At the committee’s Georgia Tech meeting, a DHS official informed the committee of the difficulty in trying to work through the various definitions, categories, and policies for designating, marking, and handling SBU. An ongoing government review of the use of SBU will be reported to the Director of National Intelligence, who is expected to present recommendations on standardized SBU procedures for the President's approval in 2007. At the MIT regional meeting, Judith Reppy, Cornell University, said: “In many cases, these new regulations have been implemented with very little regard for the core values [or benefits] of the university, namely, the free and open exchange of information.” 30 Others noted that classification policies have become more complex, farther reaching, and in the view of some, inconsistent and illogical. Judith Reppy went on to note: …in practice, the regulations in this area are so complex that they can only be understood by specialists, which is why we have these new bureaucracies. The rules as they are written … are really arcane for any normal person. I think the real problem here though is one of consistency.31 A survey of 20 institutions in 2003-2004 conducted under the auspices of the Association of American Universities and the Council on Governmental Relations found 138 instances of attempts by the government to restrict publication of data or foreign national participation in research. Most of these restrictions showed up with the inclusion of the Defense Federal Acquisition Regulation Supplement (DFARS) 7000 clause, which relates to access or the generation of unclassified information that may be sensitive.32 Anecdotal information presented at the regional meetings indicates that restrictions are continuing to be placed in research awards; however, it is not known whether the number and frequency of restrictions is increasing. Recommendation 3 : The data collected in the 2004 Association of American Universities and Council on Governmental Relations report, Restrictions on Research Grants andContracts , should be updated annually. The report should be expanded to include review of other restrictive clauses and should specifically review the use of the “sensitive but unclassified” category. The results of this report should be provided to the U.S. Office of Science and Technology Policy and the proposed new Science and Security Commission (Recommendation 12) and released to the broader academic community.

#### Wide-scale resistance to military funding alters the structure of federal funding – removes control

Winograd 87 [Terry Winograd (CS professor at Stanford), "Strategic Computing Research and the Universities," appeared in *Strategic Computing: Defense Research and High Technology*, 1987] AZ

The most direct action that individual researchers or institutions take is to refuse military funding (either in general, from particular sources, or for particular projects). Many universities have a policy of refusing classified research, and some research institutes do not, on principle, accept funding for applied military research, although they will accept it for what they consider basic research. There are individuals, including myself and Professor Joseph Weizenbaum of MIT24, who reject all military funding. For the reasons discussed above, the cost of refusing funding (to both the individual researcher and his or her institution) can be high, and often it is not feasible without dropping out of the research area altogether. In many cases there are no alternate sources of support, and in others nonmilitary sources cannot provide the amount or kind of resources necessary. In order to make this strategy a viable alternative, pressure needs to be brought to bear on a larger scale-to change the overall pattern of how government research spending is managed. As a step in this direction, criticism of military research funding has been taken up by larger groups. The Stanford SWOPSI report, mentioned above, was an attempt by a group of students and faculty to raise the issue of research funding on a larger scale and to affect public opinion. More recently, there has been a growing campaign among researchers around the country (and the world) seeking pledges that they will not accept SDI funding. As of summer 1986, over 3,800 university faculty members (mostly in physics and computer science) had signed this pledge, representing majorities in 110 research departments. They are concerned with the direct effects of the funding on campus (especially the skewing of research priorities and the potential for imposition of secrecy) and also with opposing the SDI project on the grounds that it is not feasible or effective in increasing national security. In the case of the Strategic Defense Initiative, this refusal has had a visible impact on the program. In discussing the decision by many scientists not to work on SDI research, Lt. Col. David Audley (head of the battle management and command, control, and communications program for the SDI) told of some code used in an astronomy project that “had just what we needed, but the guy who owned the code restricted it so it couldn’t be applied for SDI... It hurts. We need all the talent that we have.“25 Other groups have taken public education about military research goals as a primary activity. For example, Computer Professionals for Social Responsibility has issued informational papers on several issues, including the SC1 and the SDI.26It has also worked with universities to sponsor public debates on the technical merits of the SDI, in order to give the public a more balanced view in which computer science experts argue both sides. As an organization of computer professionals, CPSR provides expert testimony to counteract the “enlistment” through funding of university scientists into the debate over projects and strategies. Those of us doing computer science research in the universities must acknowledge the fact that computer technology plays a major role in modern military development. We have the obligation to ourselves and to our students to seriously examine the consequences of our actions, in all of the domains I have discussed, and to make informed and responsible decisions about our work and the ways in which it is supported.

#### By preventing scientific innovation, research controls leave us more vulnerable to bio-threats and terror attacks

Knezo 6 (Genevieve J. Knezo – Specialist in Science and Technology Policy Resources, Science, and Industry Division + this is a CRS Report for Congress, pgs. 36 – 53, “Controls on Unclassified Biological Research Information”, “’Sensitive But Unclassified’ Information and Other Controls: Policy and Options for Scientific and Technical Information”, https://fas.org/sgp/crs/secrecy/RL33303.pdf)

Contentious Issues, Together With Legislative

Action and Other Options The need to balance security and access poses a dilemma for policymakers that was captured in the text of a joint report prepared in December 2004 by the Heritage Foundation and Center for Strategic and International Studies. The report noted that “[I]t is necessary to strike the right balances in sharing information with or withholding information from the public. Policies that are either overly neglectful or overzealous ill serve efforts to enhance homeland security.”212 Some critics contend that many government-instituted controls on sensitive information, or on scientific and technical information, may be unwarranted. For instance, OMB Watch, an interest group newsletter that advocates more access to information, maintains an inventory and website that lists information that federal and state agencies have removed from public access for security reasons.213 In March 2005, Steven Aftergood, the editor of Secrecy News, published online by the Federation of American Scientists, catalogued information deleted, sometimes, he contends, inappropriately, from government files or to which public access has been denied. This information includes unclassified technical reports from the Los Alamos National Laboratory, 30- to 50-year old historical records at the National Archives, orbits of Earth satellites, aeronautical maps, and data previously available from the National Geospatial Intelligence Agency.214 Some of the critiques of information control policies in specific scientific and technical arenas have already been described in this report. In addition, a number of criticisms have been made that cut across sensitive information controls broadly and may influence decisions about balancing security and access to sensitive unclassified information. These criticisms, which are discussed next, focus on allegations that some controls can exacerbate vulnerability or stifle scientific research and technological innovation; vagaries in nondisclosure requirements; the relationship of SBU to FOIA; inconsistency in agencies’ definitions of and processes to identify SBU information; developing a standard definition of SBU information; monitoring agency use of risk-based standards for SBU; and recommendations for better governance of SBU information procedures. These sections also identify legislation that has been introduced and action Congress has taken on some of these issues. Allegations That Some Controls Can Exacerbate Vulnerability and Stifle Scientific Research and Technological Innovation Sensitive information controls may protect vulnerable buildings and public services from terrorist threats, but some critics allege that preventing access to such information can exacerbate vulnerabilities and stifle the development of innovations to enhance protection. According to one critic, A large sign in New York City, indicating the location of a natural pipeline was taken down after a website posted a photograph of the sign.... Although federal regulations require that the location of natural gas lines be made as obvious as possible to the public for safety reasons, the company that owns the pipeline asserted that local laws allowed the sign’s removal. ... The regulations requiring that natural gas pipelines be clearly marked were established to prevent accidental rupture that often causes injuries an deaths to residents, contractors, and energy responders. Ironically, removing such information puts the public in greater danger of lethal accidents.215 Some say that protections on information access and dissemination are especially burdensome to scientific research and academic research and that the scientific community’s potential to generate knowledge and innovations to assist in combating terrorism could be compromised by overzealous information security controls. For instance, “[t]errorists will obtain knowledge,” one critic emphasized.216 “Our best option is to blunt their efforts to exploit it. Keeping scientists from sharing information damages our ability to respond to terrorism and to natural disease, which is more likely and just as devastating. Our best hope to head off both threats may well be to stay one step ahead.”217 On October 18, 2002, the three presidents of the National Academies issued a statement that sought to balance security and openness in disseminating scientific information. It summarized the policy dilemma by saying that “restrictions are clearly needed to safeguard strategic secrets; but openness also is needed to accelerate the progress of technical knowledge and enhance the nation’s understanding of potential threats.” The statement encouraged the government to reiterate government policy that basic scientific research should not be classified, that nonclassified research reporting should not be restricted, and that vague and poorly defined categories of research information, such as sensitive but unclassified, should not be used. “The inevitable effect is to stifle scientific creativity and to weaken national security.” The statement outlined “action points” for both government and professional societies to consider when developing a dialogue about procedures to safeguard scientific and technical information that could possibly be of use to potential terrorists. An American Civil Liberties Union (ACLU) report addressing governmental restrictions on science, observed that “[t]he ‘sensitive but unclassified’ and equivalent categories that effectively bar public access to information must be eliminated. All information should either be properly classified or unrestricted.”218 Similarly, the American Association of University Professors recommended, “We should resist or seek to repeal efforts to regulate unduly, or to make secret, the results of lawful research projects under novel uses of the “sensitive but unclassified” rubric.”219 The National Academies held a workshop on this subject early in 2003, in cooperation with the Center for Strategic and International Studies. Subsequently, the CSIS and the Academies established a “Roundtable on Scientific Communication and National Security,” a working group composed of scientific and security leaders that will hold continuing discussions to try to develop a workable publications policy. (For additional information, see the aforementioned CRS Report RL31845.) The National Academies also have a separate Committee on Scientific Communication and National Security (CSCANS), whose purpose is to clarify “the national interest with regard to these issues, and inform the policy debate on the relationship between science and national security.”220 The Academy also established a Committee on a “New University-Government Partnership for Science and Security,” to hold regional meetings that will 1) bring together faculty and research administrators, government officials from research and national security agencies, and congressional members; and 2) focus on a. restrictive clauses in federal contracts and grants; b. dissemination of scientific information; c. sensitive but unclassified information; and d. the management of biological agents in academic research.221

### 1AC – Advanced Materials

#### Acceptance of the government contracts restricts fundamental research

FDP 08 [(Federal Demonstration Partnership) “RESTRICTIONS ON RESEARCH AWARDS: TROUBLESOME CLAUSES 2007/2008” A REPORT OF THE COUNCIL ON GOVERNMENTAL RELATIONS (COGR) ASSOCIATION OF AMERICAN UNIVERSITIES (AAU) July 2008] AT

The 2004 report also presented information on the eventual disposition of these restrictions by the institutions. In nearly all cases, the terms and conditions were negotiated between the institutions and the sponsors. Three institutions rejected awards due to the inability to negotiate the terms of the DFARS 7000 clause, while six rejected awards that contained other terms restricting publication. Four awards were rejected because of foreign national restrictions, and two were rejected because of other restrictions on access to or dissemination of research results. In many instances, alternative terms and conditions were successfully negotiated. However, where the participating institutions were unable to negotiate any changes, they accepted the 7000 clause or other publication restrictions in 29 instances and accepted restrictions on foreign nationals in 10 instances. In circumstances where the participating institutions accepted the 7000 clause, they indicated that it was done reluctantly and only after long negotiation with the sponsors. In some cases, institutions reported that the decision to accept was based on the nature of the research or that inclusion of the clause was unlikely to harm graduate students or faculty; the programmatic value in performing the research outweighed the risk of rejecting the award. The report indicated that in 75 percent of these cases, resolution of the issues took more than one month; in 25 percent of the cases, resolution took between three and six months. Three cases took more than six months. The report noted that “failure to reach timely resolution of these troublesome clauses creates hardships, sometimes quite severe. Delays may cause students not to be hired to work on projects and may delay significantly completion of theses and dissertations. Faculty and researchers are often forced to turn their attention and talents toward research projects that do not involve these difficulties. For a sponsoring agency, delays may unduly restrict an agency in its mission to have research performed….” The report also noted that lengthy negotiations harm the conduct of research of high value to the nation. The federal government and industry increasingly depend on universities to perform fundamental research that sustains the nation’s leadership in education and innovation. Unfettered transmission of knowledge is a core value of higher educational institutions. Most have a formal policy against accepting sponsor restrictions on publication or information disclosure; many also preclude discrimination on the basis of nationality in activities conducted on campus. Significant time delays imposed by negotiation of these restrictions, and, in some cases, failure to reach agreement, threaten the ability of universities to pursue research of national importance. The report made two general recommendations: (1) that agencies adhere to the spirit of NSDD-189 by not imposing publication and/or foreign national restrictions on fundamental research projects undertaken by universities; and (2) that agencies distinguish between the open nature of university research and that done by industry under restricted circumstances, and make clear to industrial prime awardees that restrictions on publications and foreign national participation need not be flowed down to university subawardees where the purpose is fundamental research. The report specifically recommended that DOD revise the DFARS prescription guidance to provide that the 7000 clause not be used in contracts for university research, either directly or as a flow down.

#### These restrictions gut semiconductor research, advanced materials research, and defense cooperation with allies abroad

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The “ITAR-tainting” issue creates a different type of problem. In this case US firms—such as advanced material developers—find themselves reluctant to engage in R&D activities funded by the Department of Defense because this raises future prospects that the products based on this R&D—although intrinsically commercial—will be saddled with ITAR controls due to the link to defense-funded R&D. The impact on firms is that it reduces the sources of R&D funding, if firms see the ITAR constraints as excessive, and even has driven firms to conduct their R&D abroad. The impact on DoD is that it discourages potential partnerships that might provide advantages for future defense applications. The increasing intrusiveness and implicit distrust conveyed by US export control implementation with respect to China—a market that is expected to fuel the next stage of growth and development for semiconductor and machine tool firms as well as other high technology industries—threaten to make US companies unattractive business partners. The costs of compliance, particularly with some of the proposed measures aimed at China, are becoming a matter of concern for US firms and represent a unilateral disadvantage to US-based firms in increasingly competitive international markets. For example, the risk and difficulty of complying with “deemed exports” regulations—a license that must be obtained before providing to foreign nationals information related to controlled technologies—has led some US companies to no longer hire foreign nationals, thus restricting their access to talented scientists and engineers. These qualitative factors—unreliability in supply, the unilateral nature of export control measures, restricted access to foreign talent, and barriers to developing a foothold in emerging markets such as China—could eventually be reflected in diminished competitiveness of leading-edge US industries. In order to take advantage of global talent and develop customized offerings for foreign markets, industrial enterprises around the world are increasingly distributing globally and becoming intensely interactive throughout their supply chains. If US export controls inhibit US firms from competing in the changing global business environment, this may disrupt US industry’s supply chain and technology development strategies, and choke off promising market expansions and diversification opportunities. In interviews with individual firms it is apparent that US companies are already being constrained in supply chain choices by export control restrictions. In some cases export control measures are actually encouraging R&D and capital investment overseas, as well as discouraging R&D partnerships with US firms and 4 the DOD. (These ideas will be developed in more detail in the “Overall Conclusions” subsection.) Furthermore, certain near-term issues, if unaddressed, could lead to additional problems for the US industry. Proposed changes to Department of Commerce rules for dual use exports to China, if adopted, would cause currently decontrolled items to come under tighter scrutiny. The new rules would require US firms to confirm the commercial nature of customers and end-users in China, with potentially severe penalties for exporting equipment or technology that was found to have a military end-use. For companies producing general purpose equipment or materials, such verification could be impossible, conferring potentially open-ended liability on US firms. (This problem could be mitigated by the “Validated End-User” provisions of the proposed rules—which would provide a blanket license for the export of specifically approved items to specific foreign entities—though it is unclear how readily that designation will be given and how much of the export control burden it will relieve.) Also, the prospective shift of controls on semiconductors from the CCL to the much more restrictive ITAR, due to outdated criteria for radiation tolerance of microelectronics, could make their products non-competitive—products that today are essentially uncontrolled. C. SECTOR FINDINGS In the four industries studied, the study teams found the following: o Satellite manufacturing: There is little quantitative evidence that export controls have diminished US satellite prime contractors’ success in international markets. However, because state-of-the-art communications satellites and components have become available from multiple global sources, specific technical criteria related to military criticality should be used to determine when the ITAR needs to be applied to these exports. Otherwise, US industry runs the risk of being impaired, if not disadvantaged, in the future satellite market, without achieving any national security benefit. Moreover, the large backlogs and long processing times for processing ITAR cases have become a serious issue for satellites (as well as for defense-related trade overall). This issue needs to be addressed. In addition, for satellites, the value and costs of requiring detailed monitoring of meetings with foreign satellite customers and partners should be reconsidered. 5 o Semiconductor Industry: Semiconductor device firms and semiconductor materials and equipment firms did not report significant lost sales or competitive impacts from application of US export controls. However, the proposed CCL rule changes involving China and expansion of deemed exports controls could have significant impacts on the competitiveness of the industry going forward, including foreign migration of manufacturing capabilities and technical talent. A critical issue on the horizon is the potential shift of control of semiconductor integrated circuits from the CCL to the ITAR due to the increasing radiation tolerance conferred by modern manufacturing methods. Under current “see through” rules, systems containing controlled integrated circuits would be considered controlled items as well, which, if not addressed, would create a serious impediment to the US export market for electronic goods as well as integrated circuits themselves. o Machine Tools: Data going back more than a decade suggest that declining US machine tool exports are due to the loss of competitiveness of US machine tool producers, not due to unilateral US export controls. US industry made strategic decisions back in the 1980s to focus on the US automobile industry and cede other segments of the business to foreign firms. Those decisions, along with changes in the composition of US automobile manufacturing, account for the current state of the industry. However, for firms in certain advanced technology areas—critical to both defense and commercial markets, particularly aerospace—differential US application of export controls is leading to product development being moved overseas, as well as dampening global sales to China, the fastest growing market. o Advanced Materials: Advanced materials, such as carbon-fiber polymer matrix composites, CF-PMC, are employed in an increasing variety of products, from tennis rackets to auto bodies to missiles and aircraft. Commercial aircraft are the fastest growing market for this material. The burgeoning market for these materials is encouraging new production facilities worldwide. Employing CF-PMC requires considerable interaction throughout the value chain from the fiber producers up through intermediate materials suppliers to the integrated product producers, making the industry increasingly affected by export controls. (Materials themselves, e.g., fibers and the prepregs, are largely not controlled; rather, controls apply mainly on 6 the technical know-how for employing them in integrated products.) The US CF-PMC industrial base today is robust and growing, but the major US firms are concerned that inhibiting their relationships with downstream integrators will encourage these integrators to develop alternative foreign sources and shift advanced R&D offshore. Executive summaries of the reports for these four industries appear in Section II. The full reports are published in a separate volume of appendices. D. CONCLUDING OBSERVATIONS The current US export control system appears to be out of step with today’s world of global manufacturing, technology development, and capital flows. Technology products often use components or manufacturing services from a variety of countries based on competitive advantages in niche areas. Countries that buy technology products from the US typically do so because US firms offer the best value, not because the country could not obtain the products from a variety of sources worldwide or produce the necessary technologies domestically. Selling, sourcing, and teaming internationally are increasingly important for competing as a global technological enterprise. Inhibiting these international business relationships makes enterprises more insular and less responsive to customers. When US export controls interfere with foreign partnering in high tech systems development, they encourage advanced technology and manufacturing investment to take place overseas. This practice has already begun in the machine tools and the advanced materials industries and is likely happening in the semiconductor industry as well. In the satellite industry, the increasing number of foreign components advertised as “ITAR free” testifies to the perceived advantage to satellite developers of avoiding US export controls. Quantitative analyses on historical data miss these emergent trends and dynamics. In sectors such as integrated circuits and advanced materials, US producers still have a reservoir of intellectual property, product capabilities and process know-how built over several decades. These historical advantages naturally dissipate as global capabilities rise and need to be replaced with new competencies tightly linked with global supply chains in order to maintain US firms’ market position and technological leadership. This erosion is hard to perceive clearly until it shows up in hard data, at which point it may be impossible to reverse. 7 These increasingly global dynamics of the high-tech industrial sectors make it more difficult to implement export controls effectively. With Europe, Japan, South Korea and Taiwan having become highly competitive across the range of advanced technology sectors, and China and India not far behind; global firms are seeking to access global markets through joint ventures and partnerships. With multiple potential sources dispersed throughout the globe, the ability of governmentally-imposed controls to limit technology transfer and development is becoming increasingly difficult. Boeing, the US- based leader in commercial aircraft, and US-based Hexcel, the largest advanced composite materials producer, are in partnership with China’s leading commercial and military aircraft producer, AVIC-1, to produce composites structures for the 787 and a host of other commercial aircraft. At the same time, its main competitor, Airbus, as well as several other lower-tier aircraft makers, such as Embraer of Brazil and Bombadier of Canada, have set up extensive production facilities including final assembly lines, in China.6 Major microelectronics firms based in several countries—Motorola, Intel, Samsung, Toshiba, TSMC and others—are undertaking Chinese joint ventures. Microsoft’s advanced technology research center in China pursues world leading research in self-forming, self-healing, distributed communications networks, a capability also being pursued avidly by the US DoD.7 This dispersion and interconnectedness of technology development and production creates a fundamental challenge to the ability to effectively implement export controls. Moreover, there are potential impacts on future US defense capabilities in instances where US export controls have interfered with international defense cooperative programs, through their effects on domestic suppliers of US foreign military sales and associated export trade offsets. Of particular concern in an age of increasing coalition warfare are the impacts of controls on DoD development and acquisition with close allies, through their impedance of foreign partnerships necessary to major new defense programs such as the F-35 Lightning (Joint Strike Fighter). There are similar impacts on offshore manufacturing partners of America’s legacy military systems for DoD’s own use. Given this rapidly transforming world of global enterprise, it may be time to assess more broadly how these global economic dynamics impact the effective implementation of export controls. Some questions for such an assessment could include: What is the role of technology exports in supporting emerging coalition warfare needs and how do export controls affect these? Are unilateral export control measures damaging the economic competitiveness of US firms and allowing others to expand their market positions, without achieving our security goals? Given the access to global networks of technology and supply, how do controls on advancing economies such as China or India, as the US is currently employing and implementing them, serve US security interests? Despite the global economic patterns discussed above, have controls had positive effects on slowing access to key technologies for such countries as North Korea and Iran? A. SATELLITE INDUSTRY This sector study focused on the impacts of ITAR on the US satellite industry. The study considered quantitative metrics such as lost revenues and unilateral costs, metrics on competitiveness, as well as qualitative impacts such as access to international talent. Data were collected via (1) interviews with industry, academia, and government officials; (2) government and industry reports; and (3) various open publications. From these sources, IDA constructed a database of global satellite sales, launches and subcontracts by region and by type for the period 1995-2006. This database was used to analyze the market position of US satellite prime contractors and subcontractors over time and to discern any changes in that position due to changes in export controls. Today, all satellite and satellite component exports are licensed through the ITAR process, administered by the US Department of State (DoS). Related services and technical data transactions must also be licensed under a Technical Assistance Agreement (TAA). A representative from the Defense Technology Security Administration (DTSA) must be present at all meetings with foreign persons (with exemptions possible for NATO and other major allies), and Congress must be notified of all contracts valued at more than fifty million dollars. Between 1995 and 1999, export of commercial satellites, components and services were regulated under the Commerce Control List, administered by the Department of Commerce. The CCL regulates exports of “dual use” technologies and equipment: i.e., items that are primarily used for commercial purposes but also have significant military applications. CCL controls generally are significantly less stringent and more transparent than ITAR controls. Throughout the period from 1997 to today foreign governments have regulated commercial satellite exports under their commercial export control regimes based on the “Wassenaar Arrangement on Export Controls for Conventional Arms and Dual-Use Goods and Technologies,” while in 1999 the US controls on satellites were moved by Congress to the ITAR from the CCL. Commercial satellites have become a global commodity with little difference between products offered by US and European primes in terms of performance, reliability, or ease of use. By applying ITAR controls to satellites, the US seeks to control technologies that are not tightly controlled by foreign 11 governments and are widely available from foreign sources. The changeover in US satellite export controls from CCL to ITAR in 1999 provides a basis for comparison of the impact of the US export control regime on the competitive position of US industry relative to their foreign competition—a concern that has been raised frequently by the US satellite industry. The Department of State is currently overwhelmed by the quantity of ITAR applications—an increase of more than fifty percent since 2000—with processing delays often reaching several months. The backlog of cases is massive and growing as of this writing. In one instance, consideration of a satellite company’s license application did not begin for six months after submission. License applications are processed case-by-case, with little transparency or predictability. The impact of processing delays and uncertainties is particularly acute for TAAs, directly affecting business development and execution of contracts. Because foreign suppliers do not face similar controls, US export controls and their implementation impose unilateral hurdles on US satellite makers and suppliers and risk creating dissatisfaction among foreign customer with US suppliers. Industry representatives cited specific cases in which contract awards were lost due to ITAR processing delays or the inability to share technical data to back up a US company’s offering. Additional licenses are required for failure investigations, and a foreign subsystem that is sent to the exporting country for repair must be licensed for its return to the customer, meaning that US firm importing that subsystem cannot respond rapidly to urgent customer needs. One US subtier supplier indicated that it might exit the international marketplace if a “solution to export controls (is) not found.” The precise economic impact of such delays and additional constraints on US satellite firms on the overall US satellite industry is difficult to discern against broader trends in the satellite industry, which is cyclical and “lumpy” due to the small number of launches in any given year. The transfer of export controls on satellites from CCL to ITAR in 1999 corresponded with a major downturn for the worldwide industry. Satellite manufacturers faced significant overcapacity due to the development of larger, longer- lasting satellites, and more efficient use of spectrum.8 The combination of growth in power, size, and design life make the average satellite of today approximately nine times more capable than the average satellite launched in 1990. Additionally in the mid-1990s, the European firms EADS and Alcatel aggressively entered the satellite market. Given these trends, US satellite revenue hit an all time low of $3.2 billion in 2005, and overall US market share decreased as well. The global export market is comprised primarily of commercial geosynchronous (GEO) satellites, and US commercial GEO satellites are the predominant US satellite export. From 1995-2006, export revenue from commercial GEO programs was about half of US firms’ total GEO revenues. The US has historically dominated the global GEO export market. However, US market share for satellite prime contractors between 1995 and 1999 (under CCL control) was 68% compared to 58% between 2000 and 2006 (under ITAR), while EU firms’ market share increased from 19% to 28% during the same periods. US industry cites this shift as evidence of the impact of tighter export controls. For example, Canadian TELESAT bought fifteen satellites from US vendors prior to 1999 but acquired the last three from Astrium, stating to the US vendor, “We will not buy from US due to export controls.” Nevertheless, analysis indicates that changes in US GEO market share have been consistent with trends in the global GEO and domestic US satellite markets. Due to the small number of launches, market share can vary widely by manufacturer and by region from year to year. For instance, US market share in 2005, measured in revenues, was 37%, but in 2006 it was 75%. Thus, while the entry of European firms into the satellite market clearly created additional options for the satellite telecommunications service providers, the data is not conclusive that export controls have had a major impact on the competitive position of US satellite makers and subtier suppliers. Major telecommunications service providers represent a large share of the commercial GEO market. These customers tend to purchase from companies from a specific region. Eutelsat, a European intergovernmental organization, has always purchased from European companies. Similarly, many US companies only buy US-made satellites. Moreover, customers switch manufacturers within a region: Data show that customers will often change prime contractors, even within major constellations. Viewed from the perspective of customer buying trends, Canadian TELESAT is the only example of a major customer permanently moving away from US manufacturers after the change in export jurisdiction from CCL to ITAR. Arabsat, while blaming ITAR for not buying US satellites, has actually never purchased a US satellite. ITAR controls may have contributed to a drop in US sales to European customers, but the US presence in Europe was small to begin with. 13 While China has never been a large GEO customer, those satellites it has imported have been mainly from the US. However, since 1999 a European firm has won a few contracts. Over the next decade the Teal Group forecasts sixteen Chinese satellite programs scheduled with all of these being indigenous. With the Chinese seeking to produce satellites for themselves, there are no major market opportunities in China for ITAR to impact. China claims to be achieving “many important technology breakthroughs through independent research” and, as in other technology areas, is pursuing increasingly sophisticated indigenous capabilities. This raises the prospect that in the future China may be a competitor in satellites rather than a customer. Satellite component markets tend to be linked to the prime contractors and hence show the same regional biases: European primes tend to use European subcontractors, and US primes buy from US firms. Because US component manufacturers did not have a large share of the European market before 1999, US firms did not appear to lose market share abroad following the 1999 ITAR change (though the study’s data on this was limited). Outside Europe, the US component manufacturers have increased their foreign market share. Recent moves by European firms, which sometimes advertise their offerings as being “ITAR-free,” may erode the small foothold US component manufacturers have in emerging foreign markets. Universities have claimed that export controls make US graduate school less attractive relative to their foreign competition, inhibit their foreign faculty in their research, interfere with cooperative research with foreign nationals, and force universities to decline certain research grants. Analysis of the data did not confirm any of these effects, though data specific to the satellite industry was not readily available. In conclusion, export controls are only one factor in the buying decisions of satellite customers. European capabilities and presence were growing relative to the US before the shift from CCL to ITAR, and all existing manufacturers can expect to lose market share as emerging countries develop indigenous capabilities. All in all, there is little quantitative evidence that export controls have diminished US prime contractors’ success in international markets. This being said, strong and increasing foreign availability raises strong doubts as to whether US export controls have any benefit for US national security that would justify stringent ITAR controls. If the intent of US export control policy on satellite technology is intended to keep China behind the state of the art, to keep US firms ahead of rest of world, or to sustain US industrial capabilities, these policies have failed. If anything, export controls have likely 14 spurred foreign governments to develop their own industrial capabilities and avoid use of US technology. The study team recommends that the US adopt specific technical criteria related to military criticality, via the Commodity Jurisdiction Review process, in order to determine whether ITAR controls should be applied to particular satellites and components. The value and need for detailed DTSA monitoring of satellite- related meetings with foreign customers and suppliers should be reconsidered. Moreover, the serious breakdown in ITAR case processing should be rectified. B. SEMICONDUCTOR INDUSTRY For the purposes of this sector study, the “semiconductor industry” comprises firms producing semiconductor materials, semiconductor manufacturing equipment (SME), and semiconductor integrated circuits (ICs).9 Worldwide revenues in 2005 were $31 billion, $34 billion, and $227 billion, respectively. The semiconductor industry is widely viewed as “strategic,” supporting economic growth through innovative clusters of electronics and broader information technology (IT) firms (such as in “Silicon Valley”), as well providing high value-added exports and high-wage employment. Beyond the economic importance of the semiconductor industry, today’s dominant US conventional military capabilities derive from the US Department of Defense’s relative success in fostering and exploiting semiconductor-based computer, communication and sensor networks for military purposes. Advantages in “network centric warfare” based on advanced electronics, is assumed in much of current US defense strategy and planning. While electronics and IT are critical to US military capabilities, the most advanced ICs today play a relatively small role, and the US Department of Defense (DoD) is a niche player in the market. With a few exceptions in areas such as sensors and intelligence systems, the ICs embedded within today’s most advanced military systems tend to be far from commercial state-of-the-art. Nevertheless, the US government has sought to prevent adversaries from accessing the most advanced ICs, SME and materials through the CCL, administered by the US Department of Commerce. Radiation hardened (RADHARD) ICs used in nuclear and space systems are controlled by the Department of State through the ITAR. US export controls are coordinated internationally through the “Wassenaar Arrangement on Export Controls for Conventional Arms and Dual-Use Goods and Technologies,” which came into force in 1996 as successor to the Soviet-era “Coordinating Committee for Multilateral Export Controls” (CoCom). US-based IC, SME and materials firms depend on exports. For US-based IC firms, much of their market is serving electronics products manufacturers (both US and foreign-owned) located outside of the US. For SME and materials firms, this is due to rapid growth of advanced IC manufacturing in Taiwan, China and Korea (a significant portion of which is due to foreign direct investment by US-based firms). Some observers of the US semiconductor industry are concerned about this migration as well as the loss of US commercial participation in certain SME segments. Disparities in application of export controls by the US relative to its Wassenaar partners is said to exacerbate the problem by restricting US industry in accessing rapidly growing Asian markets, without conferring any national security benefit, due to the ability of the Chinese to access comparable technologies from Europe and Japan. Semiconductor industry leaders have called on the US government to address these disparities as part of a broader effort to respond to purported unfair trade practices by foreign governments, organizations, or firms. This study found that, since the inception of Wassenaar, US-based IC, SME and materials companies have not been severely impacted by export controls, but this may not be the case going forward. US implementation of semiconductor export controls burdens US semiconductor companies with more conditions on foreign sales and longer and less predictable waiting periods for license approval than that faced by competitors in Europe or Japan selling comparable products, but licenses are rarely denied. Companies contacted by this study and published reports cite only a handful of instances where sales were lost to a foreign competitor due to delays or conditions in US export licensing. However, staffing requirements and the administrative burden of export controls represent a unilateral cost to US industry relative to its foreign competitors. The costs of compliance are rising and threaten to become a competitive disadvantage to US- based firms in the increasingly competitive international semiconductor industry. More importantly, licensing delays and uncertainties threaten to give US suppliers a reputation for being unreliable partners in the lean, “just in time,” worldwide supply chains that increasingly characterize high technology industries. Implementation of “deemed exports”—a license that must be obtained before providing to foreign nationals information related to controlled technologies—has led some companies to no longer hire 16 Chinese researchers and other controlled foreign nationals due to the risk and difficulty of complying with these regulations. Many of these talented individuals are doubtless hired by foreign competitors. As of this writing, unilateral costs to US-based semiconductor firms are relatively small in direct, quantitative terms. Qualitative factors—reputation for unreliability in supply, diversion of R&D funds to export control compliance, restricted access to foreign talent, barriers to developing a foothold in emerging markets such as China, etc.—are hard to assess but could soon be reflected in lost sales and competitiveness. Furthermore, certain prospective issues, if unaddressed, could lead to severe if not debilitating problems for the US semiconductor industry: o Proposed changes to Department of Commerce rules for dual use exports to China, if adopted, would cause currently decontrolled SME and materials to come under tighter scrutiny. The new rules would require US firms to confirm the commercial nature of customers and end users in China, with potentially severe penalties for exporting equipment or technology that was found to be supporting the production of Chinese military systems. For SME and materials companies, such verification could be impossible, since they produce general purpose equipment that could be used to build any type of ICs, which themselves are general purpose devices. (This problem could be mitigated by the “Validated End-User” provisions of the proposed rules— which would provide a blanket license for exports to certain foreign entities—though it is unclear how readily that designation will be given and how much of the export control burden it will relieve.) The ambiguity of the proposed rules confers potentially open-ended liability on US firms, based on subjective application by the Department of Commerce. This expansion of export documentation, investigation requirements for China, and potential liability would likely be unilateral, as other Wassenaar signatories have shown no interest in similarly tightening their implementation. o Continued unilateral application of deemed exports regulations could inhibit US companies in hiring top foreign talent from controlled countries, beyond the limitations imposed by immigration policy. In the case of China, this burden adds to the incentives for top Chinese technologists to stay in country or leave the US. This disadvantages US companies relative to foreign competitors, which do not face such hiring restrictions. Deemed export regulations could also inhibit US companies from performing joint research with leading Chinese institutes, some of which are approaching world-class standing in semiconductor technology. o The criteria for control of radiation hardened ICs in Category XV (d) of the ITAR could, within a few years, encompass most ICs and any electronics products incorporating them. This would make standard commercial ICs of all types subject to intensive control as “military items” regulated by the Department of State. The reason is that continuing miniaturization of IC circuits, introduction of low-power materials, new design techniques and improving error correction software are conferring inherent radiation hardness to all ICs—enough to possibly meet the ITAR criteria for being controlled, even if these ICs were not designed for use in nuclear or space systems and would be unreliable in such applications. Under ITAR’s “see through” rules any system containing a controlled part is considered a controlled item, which could lead to the perverse outcome of subjecting Japanese video games and European cell phones to US ITAR controls, which would effectively destroy the US IC export market. ITAR controls on ICs would doubtless be unilateral, as it is quite unlikely that the US would persuade foreign sources to treat all ICs as though they were weapons. In the final analysis, for such a dynamic and globally dispersed technology as microelectronics it is very difficult for any control regime to be effective. As the locus of advanced IC consumption and production moves to Asia, including China as well as Taiwan and Korea, the underlying rationale for controlling microelectronics technologies appears to be negated. Today US IC manufacturers are little affected by export controls, although they have to maintain the processes required by the government. What is worrisome is that in the near future there will be unintended consequences seriously impacting US IC manufacturers if either the China Catch-All comes into effect as proposed or if changes are not made to the ITAR RADHARD provisions. 18 C. MACHINE TOOL INDUSTRY The machine tool industry is interesting and important to an examination of the economic impacts of export control for three reasons: o Machine tools have traditionally been an important export control concern. The 1976 Bucy report 10 emphasized that controlling manufacturing technology (the ability to make weapons) is more important than controlling weapons system operational technology. Machine tools embody manufacturing technology. The 1987 Toshiba affair (in which several advanced machine tools were exported from Japan to the Soviet Union to manufacture propellers for submarines) and the 2003 Mitutoyo debacle (Japanese Mitutoyo exported coordinate measuring machines without a license and wound up in Libya helping to make uranium refining centrifuges) are among the most significant export control violations, and they both occurred within the machine tool industry. o Export control restrictions on machine tools have been significant and very consistent over the last half century, making the sector a good case for study of the long term impact of export controls on an industry. o Today, China is the largest buyer of machine tools in the world and is the country to which most machine tool export restrictions apply. China buys about one-quarter of the world’s tools. The current impact of export controls should be apparent here, if anywhere. Machine tools have been vital to the nation’s warfighting capability since the Civil War. Machine tools build the composite surfaces of modern aircraft, which confer light weight and, for military aircraft, stealth. Machine tools mill the titanium frames that 10 “In 1976 a Defense Science Board Task Force issued a report, commonly called the Bucy report [Defense Science Board Task Force on Export of U.S. Technology, An Analysis of Export Control of U.S. Technology--A DOD Perspective (Washington, D.C.: GPO, 1976)] suggesting that the export control system should shift from a focus on products to a focus on critical technology. Basically the Bucy task force argued that, with the exception of technologies of direct military value to potential adversaries, effort to control exports should not focus on the products of technology but on design and manufacturing know-how. The report recommended that primary emphasis should be placed on (1) arrays of design and manufacturing know-how; (2) ‘keystone’ manufacturing, inspection, and test equipment; and (3) products requiring sophisticated operation, application, or maintenance know-how. The Bucy task force concluded that the preservation of the US lead in critical technological areas was becoming increasingly difficult but could be achieved, first, by denying the exportation of technology.” p. 31, Scientific Communication and National Security, NRC Report (1982) by the Committee on Science, Engineering, and Public Policy of the National Academy of Sciences. 19 provide the structure for these same aircraft. Complex parts such as centrifugal compressors in turbine engines, and precision parts, such as germanium lenses in infrared vision systems, all depend on specialized high technology machine tools. Machine tools are a small industry: about $3 billion in tools are produced annually in the US. The US machine tool industry has shrunk from being the world leader in the 1950s and 1960s to being a second tier player today. The US now provides about 5% of the world’s machine tools. Leading countries are Japan, Germany, Italy, China, and Switzerland. US machine tool production capabilities today are on par with Taiwan and South Korea. Although export controls impact industry growth and health generally, the demise of the US machine tool industry was not caused by export controls—they were not even an important contributor to the prolonged contraction. The IDA study team found that export controls reduce the revenue of the US machine tool industry by 1% - 2%. (In addition, for companies that export, the process of screening customers and applying for licenses costs about 2% of revenue, although that percentage is substantially higher for some small firms.) To the extent that there is revenue loss, it is not due to prohibited sales. Instead, the losses are in sales to potentially licensable Chinese customers. These sales are being lost to European competitors whose export control processes are swifter and more dependable. In many European countries (particularly Germany, Switzerland, Italy and Spain), the manufacturer can obtain preliminary judgments from export control authorities that permit them to confidently guarantee a Chinese customer at the time of sale that an export license will be granted. For US firms, approval of a license to export to China is never certain in advance. Furthermore, license approval in the European countries requires only a few weeks, while in the US, licenses to China usually take months. Partly as a result, European manufacturers command a 30% to 100% price premium in China, the largest machine tool market in the world. The quantitative impact of export controls on US exports of machine tools to China was analyzed with a gravity model of international trade in machine tools. The gravity model predicts exports from one country to another solely based on the size of machine tool production in the exporting country, the size of machine tool consumption in the importing country, and the distance between the two countries. If there is an additional factor that strongly affects exports, such as export controls, it ought to appear as a discrepancy between actual exports and the exports predicted by the gravity model. 20 Figure 1 compares the gravity model with actual exports from the US to China. The line labeled “model” are predictions from the gravity model, based on machine tool production and consumption of the eight major exporting countries. The line labeled “data” is actual new machine tool exports from US to China (not including parts and service). Actual exports are not significantly depressed compared to the model, which suggests that export controls do not strongly impact the dollar volume of US machine tool exports to China. 0.25 Model Data 0 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 Figure 1. Gravity Model Comparison with Actual US Exports to China To confirm this result, Figure 2 looks at all exports of new machine tools to major consumer countries during the period of interest. Actual exports to Japan and Germany are significantly lower than gravity model predictions. This indicates that the US machine tool industry is being hurt by factors that restrict exports to Germany and Japan, but not particularly by export controls on exports to China. Several experts interviewed attributed the depression in exports to Germany to German nationalism. However, Italy and Japan export into Germany at approximately the rate projected by the gravity model, and Swiss exports to Germany are almost double the model predictions. These data suggests that the perceived quality of US machine tools is the factor that depresses exports to Germany and perhaps also to Japan. 21 Then year $ billions 0.2 US to China 0.2 US to Germany 0.1 0.1 Model Data Not so bad 00 US exports underperforming 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 US to Japan 0.1 00 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 0.1 US to South Korea 0.1 US to Switzerland 00 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 Figure 2. Gravity Model Analysis of US Exports to All Countries Despite the relatively small percentage of lost sales overall, the export advantage held by the Europeans in China is beginning to deeply hurt US machine tool producers in the most advanced segments of the industry. Most of the larger US machine tool firms are owned by multinational companies. Increasingly onerous US export controls to China is driving these multinationals to pull their technology development and product development investments out of the US and focus them in Europe, accelerating the technological decline of US machine tool technology relative to the rest of the world. Given that the ultimate goal of national security export controls is to preserve technology leadership in areas that materially contribute to military capabilities, they have completely failed in the machine tool sector. US leadership has been lost, perhaps irrevocably. Whether this is a crisis or not depends on whether, in today’s world, an indigenous capability to manufacture cutting edge technology tools is still a critical defense need. 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 US to Italy 0.1 22 Then year $ billions D. ADVANCED MATERIALS INDUSTRY Advanced materials encompass a variety of technologies and a diverse set of industries. This sector study focused on advanced composites which consist of high performance fiber reinforcements (carbon, glass or aramids) embedded within various material matrices (polymer, ceramic or metal). Advanced composites can be highly engineered for a host of divergent applications (often structural in nature) while providing remarkable properties superior to conventional materials (ultra lightweight, high strength and stiffness). Characteristics of these materials important to DoD include exceptional thermal protection, impact tolerance, electronic signature reduction and reduced fatigue while also enabling novel system-of-systems concepts such as the integration of electrical and mechanical technologies within conformable structures. This sector study further focused on carbon fiber reinforced, polymer matrix composites (CF-PMC) and their use in aerostructures applications since collectively this is the most prolific and important application of advanced composites to DoD. CF-PMCs support critical and large-scale defense systems such as aircraft, space vehicles, missiles and munitions, as well as emergent applications in future military ground vehicles and naval vessels. While other US advanced composites industries share similar challenges with export controls, the CF-PMC aerostructures industrial base is the most widely impacted. The specific foci of this sector study included CF-PMC feedstock material suppliers (e.g., fiber and prepreg producers), Tier I & II composite fabricators of aerostructures and major OEM integrators of commercial and military products and systems. Additionally, the study included manufacturers of automated CF-PMC processing machines and providers of industry specific professional services (technical and marketing). Worldwide revenues of the CF-PMC industry in 2005 was estimated at $27B for fabricated composites across three major market segments—industrial, aerospace-defense and consumer product (sporting goods) applications. Of this amount approximately $7B represents the value of aerospace and defense fabricated aerostructures. Approximately $1.5B of this amount is the size of international demand for aerospace and defense feedstock materials (i.e., fiber and prepreg). Most of the CF-PMC industrial base (feedstock, composite fabricators and product integrators) is evenly distributed between, the US and Europe. The US has historically maintained leadership in space and defense aerostructures as well as related fiber and prepreg materials. Europe has traditionally maintained prominence in composites fabrication of commercial aerostructures and industrial products as well as niche areas of various high temperature resins and complex 23 woven fiber performs. However, Japan is by far the world’s leader in carbon fiber production and an emerging supplier of leading-edge commercial aerostructures. Developing countries in Asia have long dominated composites fabrication of consumer sporting goods and play a growing role in manufacturing commercial aerostructures. Many of these industry leadership positions are regularly challenged and some are shifting due to a host of emerging globalization dynamics. The early-stage development of today’s CF-PMC aerostructures industrial base began in earnest during the late 1960s and early 70s and was led by DoD R&D investment in various aerospace and defense requirements. Subsequent technology maturation and transition throughout the 1980s and early 90s were fueled by DoD acquisition of military aircraft, ballistic missiles and satellites. At the height of the Cold War, DoD constituted nearly 50% of the US industrial base demand for CF-PMC’s core feedstock material (carbon fiber). However, the large-scale popularity of CF-PMCs for diverse civilian applications quickly soared and commercial uses (industrial products, consumer goods and civilian aerospace) soon outpaced DoD demand. By 1999 DoD carbon fiber use declined to 9% of US demand and 4% of global consumption. Key factors contributing to the commercial success include increasing manufacturing affordability of CF-PMCs, a proliferation of commercial applications worldwide, and concomitant rapid industrial base globalization of CF-PMCs. DoD has benefited from increased capacity, innovation, affordability and productivity due to the expanding, commercial industrial base. These dual-use industry dynamics are increasingly becoming conflicted with US export controls. The traditional notion of exports as foreign trade of physical products is being superseded by global supply chain enterprising, offshoring of manufacturing and R&D, export trade offsets (revenue-sharing), global teaming and joint ventures, foreign direct investment, licensing of intangible assets, etc. CF-PMC exports are regulated under both the Department of Commerce (DOC) via the CCL for dual-use goods and services and the Department of State under ITAR for highly sensitive materials for ablative, signature reduction, high temperature resistance and low coefficient of thermal expansion requirements. These controls regulate sales of CF-PMC feedstock materials, fabricated aerostructures, automated manufacturing equipment and technology “know-how,” encompassing expertise in CF-PMC development, manufacturing processes, products and applications. ITAR maintains virtually complete control over exports of fabricated CF- PMC aerostructures for military and space-based end-uses and retains very tight and 24 comprehensive control over CF-PMC know-how. DOS and DOC share control over various Missile Technology Control Regime (MTCR) items and technology. DOC control of feedstock material is largely based on the physical performance levels of materials (typically strength, modulus and temperature resistance). DOC controls also regulate trade in both advanced and less advanced, automated CF-PMC manufacturing equipment. Controls on the international exchange (export) of know-how can apply to almost any facet of CF-PMCs (i.e. from development to production to sustainment) while also applying to both controlled and uncontrolled materials. While DOC regulates a rather limited number of CF-PMC feedstock materials destined for foreign markets in developing regions of the world, little to no control exists for NATO countries and within other nations with close US security ties such as Australia, Japan and South Korea. Most grades of feedstock material can be exported to almost anywhere in the world without a license, and most US exports are uncontrolled materials. More than 80% of US exports are destined to markets in Europe and most exports to Europe of controlled (licensable) materials are granted license exceptions for both commercial and most defense related uses. As such, no widespread, demonstrable adverse impacts have been found due to Department of Commerce controls on exports of CF-PMC feedstock material. However, rising foreign demand for higher performing materials and the continued shift of industrial base supply chains to emerging markets (such as China, India, Brazil, and Russia) will likely result in greater control of feedstock materials. DOC controls on know-how, however, deeply penetrate CF-PMC firms’ global supply chain through control of technical exchanges between individuals and “stacks” of enterprise-level collaborations between material suppliers, composite fabricators, subassembly contractors, OEM integrators as well as providers of engineering, design, testing and R&D support. For an example, the Boeing 787 Dreamliner commercial aircraft incorporates record use of CF-PMCs (over 50% of structural weight) and will apply some of the most sophisticated approaches to composites manufacturing. In addition the Dreamliner is employing a radically new, internationally distributed, technology development and manufacturing supply chain business model. This will result in most of the fabrication for this aircraft being outsourced with a large portion of this subcontract work taking place in developing countries to satisfy export offset obligations (revenue-sharing) while maximizing OEM cost-reduction, profits and business risk sharing. Reportedly the Department of Commerce controls on know-how have increased supply chain costs, caused scheduling delays and diminished foreign teaming 25 opportunities with attendant costs estimated to be millions of dollars. Beyond disrupting such exchanges between suppliers and customers, deemed export regulations interfere with interactions between US and foreign employees of the same firm that might collaborate on manufacturing process improvements, business development and new product innovation within the US and at offshore manufacturing and service facilities. As described in the sector report on machine tools, DOC through the CCL tightly controls automated manufacturing equipment exports, inhibiting US firm presence in certain emerging high growth markets in less developed countries (China, India, Brazil, Malaysia). European competitors enjoy licensing advantages for machine sales to China, the fastest growing market. A recently approved license in Spain to export a tape laying machine to Harbin Aircraft in China (a manufacturer of aircraft for military and commercial uses) is cited as an example of Europe’s less stringent controls providing a competitive advantage. While automation equipment licenses are regularly granted for US exports to Europe, licensing conditions can be restrictive. For example, DOC will approve a machine export to a major European aerospace and defense firm, but prohibit the use of the US equipment for the development and manufacturing of certain aerospace and defense aerostructures (missiles, launch vehicles and unmanned aircraft). US OEMs believe their European counterparts are not similarly constrained. These equipment automation restrictions impact multiple tiers of US composite fabricators and domestic prime integrators who confront controls on machine process know-how when dealing with foreign firms in their supply chain thus disrupting globally distributed manufacturing enterprises. This further underscores an important emerging phenomenon in globalized competition: individual businesses are now competing at the global level of supply-chain-verses-supply-chain rather than competing simply at the local, firm-to-firm level. Unfortunately, in the CF-PMC arena the current controls on technological know- how impinge directly on the ability to form and maintain such globally dispersed supply chains. DOC’s proposed “China Catch-All,” if implemented, would further tighten CF- PMC controlled exports to China as well as extend control to previously unregulated exports. This new rule would broadly constrict trade with a leading world market, significantly raise business uncertainty and increase regulatory risks associated with increased exposure to elevated control demands. Given that leading competitors of US firms in Europe would not face similar constraints, unilateral implementation of this proposed rule change would place US firms at an increased disadvantage. 26 ITAR controls, while specific to a limited number of very specialized military- related materials, also entail industrial base dynamics that are largely similar to those described for the dual-use industry. Most of these exports are to established European markets, and most licenses are ultimately approved. As such, no demonstrable adverse impacts were identified due to ITAR’s denial of licenses of US CF-PMC feedstock for military specific aerostructures. However, the Department of State’s implementation processes for the review and approval of licenses is besieged with serious problems including substantial delays, inconsistencies in decision-making, intrusions into supplier-customer relationships, and lack of process visibility, efficiency and accountability. These mounting problems in ITAR’s implementation could reduce US leadership in European defense markets through European integrators designing out US ITAR products and providing incentives for the formation of non-US competitors. ITAR also imposes pervasive controls on technology know-how (i.e. TAAs and MLAs), impacting not only defense firms abroad and foreign defense ministries of close US allies but also directly affecting ongoing DoD military aircraft production (UH-60 Black Hawk), development of future combat systems (F-35 Lightning II) and associated export trade offset ventures. Various manufacturing, and development programs, have experienced scheduling delays, significant increases in costs and impediments to innovation of importance to DoD. Industry reports that millions of dollars of added supply chain costs result from these controls. ITAR is increasingly impacting commercial aircraft production, due to “tainting” of CF-PMC aerostructures. Decades old legacy technology originally developed by industry with DoD funding and (or) qualification testing for a former defense program are typically considered ITAR classified (tainted). The added costs of industry “fire walls” and requalification of legacy ITAR technology for future commercial uses are measured in the tens of millions of dollars. Not only does this conflict with the fundamental business case for advancing a dual-use industrial base for the ultimate benefit of DoD and the civilian economy, but ITAR tainting can retard the continued technology maturation and future evolution of earlier R&D investments. For example, ITAR tainting impacted DoD’s recently concluded $150M Composites Affordability Initiative (CAI), in which private industry contributed 50% of the cost. The commercial aircraft industry is reluctant to commercialize CAI technologies because of ITAR tainting as major aircraft OEMs prohibit use of such tainted technologies in their products. Thus, DoD and US industry are not fully utilizing CAI’s CF-PMC investments for either military or commercial applications.

#### Advanced materials is key to scaling up graphene production for use in electronics – basic academic research is key

Probst 15 [(Laurent Probst, Laurent Frideres, Bertrand Pedersen & Steven Clarke) “The Graphene Revolution” Business Innovation Observatory, September] AT

Advancements in technology are an important driver of disruptive innovation and economic growth, and the recent isolation of a new two dimensional carbon-based honeycomb lattice product called graphene has generated enormous interest and media hype. Research suggests that this newly discovered material is the strongest, most impermeable and conductive material known to man. These unique properties have immediate market applications by incorporating it into existing products to enhance their strength, electric or thermal conductivity. But it is also hoped that research in the nanomaterial will help revolutionise fields such as electronics, energy storage, lightweight composite materials, or even biotechnology and medicine. Graphene's incredible potential might help it to become to the 21st century, what plastics were to the 20th. Today, graphene's development is still more focussed on research and development, along with product development. Graphene will become increasingly used as a component, and then eventually progress towards being incorporated into entire systems further down the line. But with time market focus will shift from research towards industry. An overall EUR 2.2 billion has been so far invested into research efforts and 7,740 patents filed between 2008 and 2012, and today the annual market for graphene in R&D and in product development is estimated at around EUR 12.7 million1. The companies presented in this case study are successful on the market thanks to their early capitalising on the discovery of this new material. They cater, or have catered at one time, to the needs of research and partnered with industrial players to incorporate graphene into existing products, or to help to develop new ones. Some companies focus on the synthesis of pristine graphene to be provided to clients early along the value chain. Some produce their own graphene-based product as a result of their expertise in graphene synthesis, while others aim to complement their graphene synthesis by providing advisory services on incorporation of graphene throughout the value chain. The graphene market is currently driven by a large amount of visibility and hype. This has helped support investment, and to keep up with ever increasing demand for energy, which is due to a rising need for energy storage and release. The technology is however not yet fully mature, and so there is much more research required before graphene can be mass produced. Ultimately the potential of the technology to impact so many different markets limits any particular focus, diluting market uptake. Several policies could be enacted in order to support this trend in Europe. First, specific solutions should be sought to facilitate compliance with the REACH Regulation. Second, standards could be established for graphene as a material, along with accepted health and safety guidelines and procedures for life cycle analyses. Third, access to research facilities and infrastructure could also be made easier for innovative SMEs. Fourth, coordination initiatives between different public support programmes at the national or regional level could be better supported. Finally and crucially, investment into fundamental research in nanomaterials should continue as it provides the basis for the future graphene revolution. Technological advancements in the production and quality of basic materials are a well-known driver of disruptive innovation and growth, particularly new advanced materials. Developments in the material sciences offer new growth prospects arising from new industrial and commercial products and processes. Within the context of this trend, this case study will present the potential for growth arising from the recently discovered material called graphene. Graphene is a two-dimensional, atomic-scale honeycomb lattice formed solely of carbon atoms where one atom forms every vertex (Figure 1). This single-atom thick, but indefinitely wide, aromatic molecule was first isolated and studied in laboratory conditions in 2003 by Geim and Novoselov2. Graphene is considered to be the strongest, most impermeable and conductive material known to man and is widely being touted as the material that will become to the 21st century, what plastics were to the 20th. Figure 1: Graphical representation of the molecular structure of a single layer of graphene Source: Graphene Flagship3 This newly discovered material has garnered huge interest because of its multiple unique properties. To begin with, research has shown that graphene is a very strong conductor of electricity. The electronic mobility of graphene is very high, albeit this is dictated by the quality of the graphene and the substrate. It has ten times the conductivity of copper and aluminium and an electrical resistance 35% smaller than copper4. Additionally, as a result of its molecular structure and the bonding arrangements between the carbon atoms, graphene is the strongest material ever discovered. It benefits from an ultimate tensile strength of 130x109 Pascals and is stronger than Aramid (the material used in Kevlar) or A36 structural steel5. Despite being a single atom thick, graphene has the surprising ability of having a high opacity, being capable of absorbing a large amount of white light. Thisgives it potential applications in photovoltaics for example. Adding more layers of graphene steadily increases this opacity6. Graphene has a huge variety of potential market applications. Its electronic conductivity properties makes it ideal as a component in electrical circuitry and it could be used to create ultra-fast electronic transistors, foldable touch screen displays (Figure 2) and light-emitting diodes as well as help increase the efficiency of batteries. Its optical properties give it the potential to have applications in photovoltaic cells, while the material’s mechanical properties have garnered interest of the aviation industry given its potential to both strengthen and reduce the weight of aircraft wings. The technology also has the potential to revolutionise the health sector e.g. tissue engineering or drug delivery. Figure 2: Graphene-based bendable touch screens Source: Nature7 The graphene market is still in its nascent stage and heavily R&D oriented. Recently, the European Research Council (ERC) granted EUR 1 billion investment for the Future and Emerging Technologies (FET) Graphene Flagship project, the largest-ever research initiative in the history of the EU. There are still several challenges to overcome before large- scale manufacturing of graphene can be achieved. While at the moment most companies involved in the technology are more focussed on R&D, the material stands to become prevalent in industrial applications once mass-produced graphene achieves the same level of performance as samples obtained in research laboratories. Some companies have already started to offer cost effective means to produce graphene, while others are even offering graphene-based components, while some have developed graphene-integrated products. The graphene revolution 3 Advanced Materials Figure 3: European roadmap for graphene science and technology Source: Graphene Flagship Roadmap8 Given that the technology readiness level of graphene is still relatively low and the market is in its early stages according to the technology roadmap (Figure 3), the majority of the companies in the graphene market cater to the academic field, with an objective of catering towards industrial clients as the market develops.

#### Graphene tech shift solves rare earth shortage – rare earth conflict causes structural violence and extinction

Sebastian Anthony 11 [(Sebastian Anthony) Rare earth crisis: Innovate, or be crushed by China, ExtremeTech 12-30-2011] AT

Many rare earths are also geochemically rare — they can only be mined in a handful of countries. This is simply down to Mother Nature being a tempestuous so-and-so: Some countries have deposits of rare earths, and some don’t. This results in massively skewed production (China famously produces 97% of the world’s rare earth metals), and, as you can imagine, a lot of national security and geopolitical troubles, too. Rare earth elements, in the Periodic TableIt doesn’t stop with rare earths, either: Many other important elements, such as platinum, are only available from one or two mines in the entire world. If South Africa sustained a huge earthquake — or was on the receiving end of a thermonuclear bomb, perhaps — the world’s supply of platinum would literally dry up over night. The continued existence of technologies that rely on platinum, like car exhaust catalytic converters and fuel cells, would be unlikely. If geochemistry and politics weren’t enough, though, we even have to factor in ethical concerns: Just like blood/conflict diamonds — diamonds that originate from war-torn African nations, where forced labor is used and the proceeds go towards buying more weapons for the warlord — some rare metals could be considered “blood metals.” Tantalum, an element that’s used to make the capacitors found in almost every modern computer, is extracted from coltan — and the world’s second largest producer of coltan is the Democratic Republic of the Congo, the home of the bloodiest wars since World War II. Not only do the proceeds from coltan exports get spent on weapons, but the main focus of the wars were the stretches of land rich in diamonds and coltan. Also along the same humanist vein, it’s important to note that extracting these rare elements is usually a very expensive and disruptive activity. Indium, probably the single most important element for the manufacture of LCDs and touchscreens, is recovered in minute quantities as a byproduct of zinc extraction. You can’t just set up an indium plant; you have to produce zinc in huge quantities, find buyers and arrange transport for that zinc, and then go to town on producing indium. In short, extracting rare elements is generally a very intensive task that is likely to disrupt or destroy existing settlements and businesses. The doomsday event that everyone is praying will never come to pass, but which every Western nation is currently planning for, is the eventual cut-off of Chinese rare earth exports. Last year, 97% of the world’s rare earth metals were produced in China — but over the last few years, the Chinese government has been shutting down mines, ostensibly to save what resources it has, and also reducing the amount of rare earth that can be exported. Last year, China produced some 130,000 tons of rare earths, but export restrictions meant that only 35,000 tons were sent to other countries. As a result, demand outside China now outstrips supply by some 40,000 tons per year, and — as expected — many countries are now stockpiling the reserves that they have. China owns the world's rare earth deposits Almost every Western country is now digging around in their backyard for rare earth-rich mud and sand, but it’ll probably be too little too late — and anyway, due to geochemistry, there’s no guarantee that explorers and assayers will find what they’re looking for. The price of rare earths are already going up, and so are the non-Chinese-made gadgets and gizmos that use them. Exacerbating the issue yet further, as technology grows more advanced, our reliance on the strange and magical properties of rare earths increases — and China, with the world’s largest workforce and a fire hose of rare earths, is perfectly poised to become the only real producer of solar power photovoltaic cells, computer chips, and more. In short, China has the world by the short hairs, and when combined with a hotting-up cyber front, it’s not hard to see how this situation might devolve into World War III. The alternate, ecological point of view, is that we’re simply living beyond the planet’s means. Either way, strategic and logistic planning to make the most of scarce metals and minerals is now one of the most important tasks that face governments and corporations. Even if large rare earth deposits are found soon, or we start recycling our gadgets in a big way, the only real solution is to somehow lessen our reliance on a finite resource. Just like oil and energy, this will probably require drastic technological leaps. Instead of reducing the amount of tantalum used in capacitors, or indium in LCD displays, we will probably have to discover completely different ways of storing energy or displaying images. My money’s on graphene.

#### And it leads to quantum computing

Wang 16 [(Brian Wang, ) Graphene Quantum Dots in Quantum Computing, No Publication 8-29-2016] AT

“Artificial atoms open up new, exciting possibilities, because we can directly tune their properties”, says Professor Joachim Burgdörfer (TU Wien, Vienna). In semiconductor materials such as gallium arsenide, trapping electrons in tiny confinements has already been shown to be possible. These structures are often referred to as “quantum dots”. Just like in an atom, where the electrons can only circle the nucleus on certain orbits, electrons in these quantum dots are forced into discrete quantum states. Even more interesting possibilities are opened up by using graphene, a material consisting of a single layer of carbon atoms, which has attracted a lot of attention in the last few years. “In most materials, electrons may occupy two different quantum states at a given energy. The high symmetry of the graphene lattice allows for four different quantum states. This opens up new pathways for quantum information processing and storage” explains Florian Libisch from TU Wien. However, creating well-controlled artificial atoms in graphene turned out to be extremely challenging. Cutting edge is not enough There are different ways of creating artificial atoms: The simplest one is putting electrons into tiny flakes, cut out of a thin layer of the material. While this works for graphene, the symmetry of the material is broken by the edges of the flake which can never be perfectly smooth. Consequently, the special four-fold multiplicity of states in graphene is reduced to the conventional two-fold one. Therefore, different ways had to be found: It is not necessary to use small graphene flakes to capture electrons. Using clever combinations of electrical and magnetic fields is a much better option. With the tip of a scanning tunnelling microscope, an electric field can be applied locally. That way, a tiny region is created within the graphene surface, in which low energy electrons can be trapped. At the same time, the electrons are forced into tiny circular orbits by applying a magnetic field. “If we would only use an electric field, quantum effects allow the electrons to quickly leave the trap” explains Libisch. The artificial atoms were measured at the RWTH Aachen by Nils Freitag and Peter Nemes-Incze in the group of Professor Markus Morgenstern. Simulations and theoretical models were developed at TU Wien (Vienna) by Larisa Chizhova, Florian Libisch and Joachim Burgdörfer. The exceptionally clean graphene sample came from the team around Andre Geim and Kostya Novoselov from Manchester (GB) – these two researchers were awarded the Nobel Prize in 2010 for creating graphene sheets for the first time. The new artificial atoms now open up new possibilities for many quantum technological experiments: “Four localized electron states with the same energy allow for switching between different quantum states to store information”, says Joachim Burgdörfer. The electrons can preserve arbitrary superpositions for a long time, ideal properties for quantum computers. In addition, the new method has the big advantage of scalability: it should be possible to fit many such artificial atoms on a small chip in order to use them for quantum information applications.

#### That solves all disease

Sergei Kouzmine 13 [(Sergei Kouzmine, Managing Partner of QWave Capital, a fund investing in quantum technology and other SciTech innovation. Sergei has more than 20 years of entrepreneurial experience, including his founding of Nonolet, a Russian PC manufacturer and distributor, where he introduced one of the first Russian computer brands. Prior to entering the business world, Sergei was a nuclear physicist) 4 Ways That Quantum Technology Could Transform Health Care, Co.Exist 9-4-2013] AT

In July, the International Conference on Quantum Technologies brought together the leading minds in physics to discuss the latest advances in quantum technology. Throughout the course of the conference, presenters demonstrated cutting-edge research with implications for everything from data security to IT to energy. There’s one industry, however, that is especially poised for massive changes on many levels from quantum technology: health care. Quantum technology is set to revolutionize the way we think about health care, medical data, and even our own biology. Why does quantum technology hold so much promise for health care? In part, it’s because many cell processes take place at the nanoscale—the world of atoms and subatomic particles. When you get down to the nanoscale, matter stops behaving according to the laws of classical physics and starts demonstrating the unique (and often counter-intuitive) properties of quantum mechanics. Using the properties of quantum mechanics, scientists are building tools that are both ultra-precise and ultra-personalized. Using the unusual properties of quantum mechanics, the scientists at the conference (and others from around the world) are building medical tools, diagnostics, and treatments that are both ultra-precise and ultra-personalized—tools that will ultimately prolong and improve our lives. Here are just a few of the most promising breakthroughs on the horizon. 1: IMPROVED DISEASE SCREENING AND TREATMENT Using a relatively new method known as the bio-barcode assay, scientists can now detect disease-specific clues, or "biomarkers," in our blood using gold nanoparticles, which are visible using MRI technology and have unique quantum properties that allow them to attach to disease-fighting cells. These gold nanoparticles are completely safe for human use. This method is also cheaper, more flexible, and more accurate than conventional alternatives. Mikhail Lukin, a physics professor at Harvard and expert in quantum optics and atomic physics, is also working on manipulating nanoscale particles of diamond for similar purposes. He hopes to eventually use diamond particles, which are non-toxic, to take images of human cells from the inside and detect disease without exposing patients to radiation. A novel type of quantum-based MRI could be used to look at single molecules. Quantum sensors can also improve the MRI machine itself by allowing for ultra-precise measurements. A novel type of quantum-based MRI could be used to look at single molecules or groups of molecules instead of the entire body, giving doctors a far more accurate picture. Hypres is an example of a company that is working to retrofit MRI machines to be more sensitive—and to work faster—by harnessing the supercurrent phenomenon known as the Josephson effect. Other quantum-based techniques are also being developed to treat diseases. For example, gold nanoparticles can be "programmed" to build up only in tumor cells, allowing for precise imaging as well as laser destruction of the tumor, without harming healthy cells. 2: NO MORE NEEDLES Researchers at the University of York have designed a patch that can be applied to skin in order to deliver targeted therapies sans hypodermic needles. The patch, called Nanject, will be used to deliver cancer drugs without harming healthy cells. Here's how it works: The nanoparticles are coated in antigens (substances that bind to antibodies) before being introduced to the body, where they attach to cancer cells. Afterwards, the patient is treated in an MRI machine that triggers the particles to heat up and destroy the cancer cells. When the machine is turned off, the particles cool back down and can be removed from the body without any harm to the patient. EDITOR'S NOTE Here's another needle-less project we wrote about recently: a patch that is giving you a constant blood test. Needle-phobic patients may also be thrilled about this kind of advancement: the Nanject patch replaces a single syringe with many tiny ones made of polymer nanofilaments that deliver the medication through hair follicles. However, there’s another, perhaps more important, benefit to the nanotech drug-delivery route: It removes some of the toughest barriers to distributing medication, particularly in remote and impoverished areas. With a patch, there is no need for a trained nurse or doctor to inject medication; it be self-administered by anyone through a process that's as simple as sticking on a band-aid. Nanotech drug delivery also allows for lower doses, since the nanoparticles aren’t eaten up by stomach acid like pill-based medications. Finally, treatments like the Nanject can help prevent the spread of disease via unsterilized needles—a major problem in developing nations. 3: HACKING HUMAN BIOLOGY Beyond improved disease screening and highly targeted, needle-free treatments, quantum mechanics holds the potential to provide us with more information about human biology. Using quantum computers, we can more quickly sequence DNA and solve other Big Data problems in health care. Australian scientists recently discovered a way to explore the inner workings of a living cell using a novel type of laser microscopy that is built on the principles of quantum mechanics. And using quantum computers, we can more quickly sequence DNA and solve other Big Data problems in health care. This opens up the possibility of personalized medicine based on individuals’ unique genetic makeup. 4: MORE SECURE HEALTH DATA People want to protect their health data for obvious reasons, so it's important to consider all the ways that it can be hacked. In the future, for example, it may become possible for hackers to retroactively intercept communications. One of the quantum conference attendees, Nicolas Gisin, works with ID Quantique, a company that is using the strange quirks of quantum phenomena to protect our data in an ultra-secure fashion. Using quantum entanglement in one of the most practical applications of the phenomenon to date, quantum cryptography prevents data from being viewed by anyone other than the intended recipient. ID Quantique already provides security to banks and governments and ultimately sees strong potential in the health care industry. Innovations built on the principles of quantum mechanics hold the potential to affect health care on nearly every level, from diagnosis and treatment to data storage and transmission. We need to keep a close eye on quantum technology and health care—an area that will benefit from increased funding for research and product development. We’re on the cusp of some thrilling advancements, and we should all educate ourselves on how quantum technology will transform health care in the not-so-distant future.

### Extra cards

#### Empirics prove – Stanford and Berkeley rejected contracts to protect academic freedom

Krieger 8 [Lisa Krieger (science writer at The Mercury News, covering research, scientific policy and environmental news from Stanford University, the University of California, NASA-Ames, U.S. Geological Survey and other Bay Area-based research facilities), "Top schools choosing academic freedom over government research restrictions," Mercury News, 7/29/2008] AZ

A few years ago, Berkeley rejected several industry subcontracts from the Defense Advanced Research Projects Agency (DARPA), the central research and development organization for the Department of Defense, said Mimura. They were worth hundreds of thousands of dollars, said Mimura. “When confronted by a restriction that in any way limits our ability to publish, then we fight back,” she said. “It is absolutely essential that we publish what we do here, that we own, because academic freedom is sacrosanct.” UC-Berkeley also has rejected contracts because of language prohibiting research by foreign nationals. Because UC has policies that prohibit discrimination in campus activities based on citizenship, it cannot accept contract language that would prevent foreign students from performing research on campus, she said. “We would never accept an obligation to ensure that a student is a U.S. citizen,” Mimura said. Similarly, Stanford University recently turned down a defense contract with Boeing because “we could not get language we agreed on,” said Provost John Etchemendy. He would not elaborate on the value of the contract, or its sticking points. “We obey the law,” he said at a conference last October. “But we do not accept any grant that restricts academic freedom, freedom of speech or infringes on institutional authority.” Moreover, with 15,000 students in an open campus setting, “it is impossible to regulate,” he said. In addition to restricting who does research, and where it is published, government officials also seek to label a new class of contracts “sensitive but unclassified,” and subject to further controls, according to the AAU-CGR report. Controls pose risks But universities caution that at a time when the nation is seeking greater competitiveness in science and engineering, restrictions could slow research and discourage foreign nationals from attending U.S. graduate schools. Ample safeguards are already in place, including visa screening for foreign nationals, limits on foreign students’ ability to participate in sensitive projects and high-security classification procedures for off-campus research at places like Lawrence Livermore Lab, schools say. “Scientific progress depends on researchers being able to fully share information about their research findings, so other researchers can benefit and build upon that,” said Bob Hardy of the Council on Governmental Relations, who co-wrote the new report. “Restrictions on our ability to do that are in conflict with the open nature of universities,” he said, “and our core value, the free exchange of information.”

#### Controls on research kill competitiveness and innovation

Krieger 8 [Lisa Krieger (science writer at The Mercury News, covering research, scientific policy and environmental news from Stanford University, the University of California, NASA-Ames, U.S. Geological Survey and other Bay Area-based research facilities), "Top schools choosing academic freedom over government research restrictions," Mercury News, 7/29/2008] AZ

But universities caution that at a time when the nation is seeking greater competitiveness in science and engineering, restrictions could slow research and discourage foreign nationals from attending U.S. graduate schools. Ample safeguards are already in place, including visa screening for foreign nationals, limits on foreign students’ ability to participate in sensitive projects and high-security classification procedures for off-campus research at places like Lawrence Livermore Lab, schools say. “Scientific progress depends on researchers being able to fully share information about their research findings, so other researchers can benefit and build upon that,” said Bob Hardy of the Council on Governmental Relations, who co-wrote the new report. “Restrictions on our ability to do that are in conflict with the open nature of universities,” he said, “and our core value, the free exchange of information.”

#### Distinction between basic and applied science

Roll-Hansen 8 [Nils Roll-Hansen (historian and philosopher of 19th and 20th century biology at University of Oslo. He is the author of four books and many academic articles), "Why the distinction between basic (theoretical) and applied (practical) research is important in the politics of science," December

1st 2008] AZ

This paper discusses three kinds of difference between applied and basic research: 1. Differences in criteria to judge the success or failure of the research. 2. Differences in effects on social processes. 3. Differences in organization, especially in degree of autonomy to political and economic interest and goals. According to the traditional view it is the correlation between differences in all three respects that makes the distinction between applied and basic research important in the politics of science. The primary criterion of success in applied research is contribution to the solution of specific practical problems. Practical technical success is the superior yardstick for evaluating applied research both in advance as projects and retrospectively in terms of results. Scientific competence of researchers is an essential condition for success, but it determines neither the choice of problem/theme nor the satisfaction of the funding patron. Applied research is funded by government agencies, private firms, non governmental interest organizations, etc to further their respective purposes in terms of social and medical improvements, economic profitability, ideological and political acclaim, etc. Basic research, on the other hand, is successful when it discovers new phenomena or new ideas of general interest. The general scientific interest is judged in the first instance by the discipline in question. But in the long run the promotion of other scientific disciplines is essential, and in the last instance the improvement of our general world picture is decisive. The aim of basic research is theoretical, to improve general understanding. It has no specific aim outside of this. But it is, of course, not accidental that improved understanding of the world increases our ability to act rationally and efficiently. It improves our grasp of what the world is like and is thus also a basis for developing efficient technologies. Some degree of realism with respect to scientific theories is inherent in basic research in this sense. The social effect of applied research, when successful, is solutions to practical problems as recognized by politicians, government bureaucrats, commercial entrepreneurs, etc. It is an instrument in the service of its patron. Applied research helps interpret and refine the patron’s problems to make them researchable, and then investigates possible solutions. The practical problems of the patron set the frame for the activity. Applied research is in this sense subordinate to social, economic and political aims. Rewards are primarily for results that help the patron realize his purposes. The result of basic research, when successful, is discovery of new phenomena and new ideas of general interest. By shaping our understanding of the world the discoveries of basic science become preconditions for any precise formulation of political and other practical problems. Sometimes basic research has a direct and dramatic effect by discovering new threatening problems and thus immediately setting a new political agenda. The present grave concern over climate change is a striking example of how politics is completely dependent on science to assess the problem, i.e. make educated guesses about its future magnitude and development, and think of possible countermeasures. The differences between applied and basic research in content, in social effects, and in criteria for success imply a different relationship to politics. Science does not only provide means (instruments) for solving tasks or problems set by politics, it also shapes social and political values and goals. Applied research is generally well adapted to serve the first task while basic research is best suited for the second. From the point of view of liberal democratic decisionmaking there is an important distinction between solving recognized problems and introducing and formulating new problems. In the first case science has an instrumental role subordinate to politics. In the second case the role is politically enlightening and depends on independence from politics to work well.3 When science is asked for advice on a fearful threat like climate change, which has not yet materialized but is only a prediction about future events, the importance of autonomy becomes particularly acute and correspondingly hard to maintain.

#### Current controls are unconstitutional

Jacobs 5 (Leslie Gielow Jacobs – Professor of Law at the University of the Pacific McGeorge School of Law, “A Troubling Equation in Contracts for Government Funded Scientific Research: “Sensitive But Unclassified” = Secret But Unconstitutional”, http://jnslp.com/wp-content/uploads/2010/08/06\_JACOBS\_REPLACEMENT\_PAGES.pdf, pgs. 113 – 115, EmmieeM)

The government’s purpose in imposing the current SBU secrecy clauses on private scientists undertaking funded research is legitimate and perhaps even compelling. It seeks to protect the national security by ensuring that our enemies do not have access to information that might help them to harm us. But purpose alone does not demonstrate the constitutionality of a government action. The mechanism by which the government achieves its secrecy purpose must be crafted to serve the government interest without unnecessarily undermining free speech. General free speech principles, as well as those addressed specifically to secrecy clauses and speech-limiting conditions on government programs, indicate that the current SBU secrecy clause intrudes too far on the free speech right. Its problematic features are its imprecise definitions, its authorization of enforcement by prepublication review, and the fact that it is not part of a system that links protected information to a clear national security danger.

#### Federal restrictions bad

Euben 4 [Donna Euben (AAUP Foundation’s Legal Defense Fund), "Academic Freedom and Professorial Speech," February 2004] AZ

Academic research that is funded by the government can, under specified conditions, be classified. An issue that has long "vexed universities and researchers" is "whether, and if so how, they can carry out classified research without impairing freedom of research and scientific progress." Classified research is generally developed in secret. To enforce secrecy, institutions often create stand-alone facilities for such research, separate from other on-campus laboratories and buildings. The AAUP recommends that "fewer restrictions [on academic research] are not only better than more, but restrictions on research, to the extent that any are required, must be precise, narrowly defined, and applied only in exceptional circumstances." A recent controversy at George Mason University highlights the new academic environment. Sean Gorman, a graduate student at the university's National Center for Technology and Law, wrote a dissertation that maps the fiber-optic network that connects businesses in the United States. The federal government classified his work. Gorman stated, "They're worried about national security. I'm worried about getting my degree." He continued, "Academics make their name as an expert in something . . . . If I can't talk about it, it's hard to get hired. It's hard to put 'classified' on your list of publications on your resume." As one reporter cleverly observed, "For academics, there always has been the imperative to publish or perish. In Gorman's case, there's a new concern: publish and perish." In the end "he will publish only the most general aspects of his work."32

#### Regulating research crushes innovation and deters potential entrants

NRC 4 [National Research Council (US) Committee on Research Standards and Practices to Prevent the Destructive Application of Biotechnology, "Information Restriction and Control Regimes," 2004] AZ

Perhaps most important, major universities have proscribed classified research on campus. Those who do accept classified research have usually created separate facilities where access can be limited and controlled.52 Secrecy would thus deprive the government of the graduate students and postdoctoral fellows who drive much of biological research—in many cases the best minds engaged in rapidly developing fields. Even without formal classification, the specter of information controls on “sensitive” information, given the current vagueness of the categories and the great difficulty of being any more exact about most of the dual use research, could be a significant deterrent to scientists to undertake research in some areas, such as infectious diseases. Yet these are precisely the areas where the best researchers are needed to help develop the nation's defenses against biological weapons, bioterrorism, and emerging-disease threats.

Thus there is a danger that the life sciences as a field of study would come to be regarded as less inviting, affecting the quality of researchers entering the field or making it more attractive to work outside the United States. Unlike the situation with nuclear weapons design/development/ production and testing, biotechnology-related research in the life sciences is an international activity and proliferation-relevant knowledge is widely held. Limiting the development of biotechnology in the United States would reduce our worldwide competitiveness in this rapidly changing field. We conclude that imposing mandatory information controls on research in the life sciences, if attempted, will be difficult and expensive with little likely gain in genuine security. The next chapter describes the system that the Committee has concluded can best meet the needs of reducing the risks of misuse of biological research while still enabling vitally needed research to meet civilian and biodefense needs to go forward.

#### Fundamental research is specifically key to semiconductors

SIA 15 [(Semiconductor Industry Association. The SIA Factbook presents a picture of the U.S. semiconductor industry and global market using data) Research & Technology Archive, Press Releases 2015] AT

Federal research advances semiconductor technology and enables new job creation The success of the semiconductor industry is due to continuous technological advances built upon robust research and development. Long-term fundamental science research performed at universities and funded by the industry and the Federal government is critical to sustaining the pipeline of new discoveries that will fuel the semiconductor industry, our nation’s economy and new job creation in America. Nanoelectronics Research Initiative (NRI), managed through the Semiconductor Research Corporation (SRC), supports university research finding a replacement technology to allow faster, smaller, more energy efficient devices beyond the limits of today’s semiconductor technology. Industry, Universities, & Government Partner on the Challenge Semiconductor industry leaders like GLOBALFOUNDRIES, IBM, Intel, Micron, and Texas Instruments contribute millions of dollars annually to this effort. Government and university support leverages these funds for a combined total of approximately $20 million annually, supporting nearly 40 universities, 75 professors, and 150 students in 20 states. In addition to directly supporting the NRI centers, the National Science Foundation (NSF) accepts NRI funding for projects at the NSF Nanoscience Centers across the U.S., which not only leverages NSF’s large investments to fuel basic science and support students, but also helps promote research in relevant areas for future nanoelectronics innovation. The National Institute of Standards and Technology (NIST), which directly supports the four NRI multi-university centers and also lends its metrology expertise. Advancing nanoelectronics requires measuring structures with atomic accuracy, characterizing new materials and molecules, and even measuring the signals from individual electrons – if we can't measure it, we can't make it. State governments in California, Indiana, New York, and Texas and the City of South Bend are investing in the NRI in recognition of the significant employment benefits that will follow commercialization of nanoelectronic technology. Continuing NRI’s Success: Action Requested Since its inception in 2005, NRI has produced 600 technical publications and 19 patent disclosures. Still this basic research is just beginning and the initial efforts are small compared to the government’s efforts in the 1940’s and 1950’s which led to the early semiconductor inventions. Nanoelectronics research must grow significantly over the next several years. Congress should continue to fund NSF and NIST budgets that support nanoelectronics research. FCRP: $40 Million Annually for Cutting-Edge Innovation Since 1997 the Department of Defense and the U.S. semiconductor and supplier industries have jointly funded university research through the Focus Center Research Program (FCRP). By focusing on mid- to long-term research projects of great interest to our national defense and the semiconductor industry, FCRP projects help maintain U.S. leadership in a technology vital to U.S. prosperity, security and intelligence. Download SIA's Issue Papers on the Nanoelectronics Research Initiative and the Focus Center Research Program SIA also supports the priorities of the Task Force on American Innovation, an alliance of America's most innovative companies, leading research universities and largest scientific societies that aims to support scientific research in the physical sciences and engineering. The National Research Council within the National Academies recently released a timely report on this topic titled "Research Universities and the Future of America: Ten Breakthrough Actions Vital to Our Nation's Prosperity and Security." Below is a video that provides insightful background on the report.

#### Basic research is a term of art

Roll-Hansen 8 [Nils Roll-Hansen (historian and philosopher of 19th and 20th century biology at University of Oslo. He is the author of four books and many academic articles), "Why the distinction between basic (theoretical) and applied (practical) research is important in the politics of science," December 2008] AZ

In the early 1960s the OECD set up an international comparative system for research statistics covering scientific research in a broad sense. This statistics was motivated by the OECD’s aim of furthering economic growth and development and therefore included not only “basic research” but also “applied research” and “experimental development.” The inclusive OECD classification followed a growing tendency to identify scientific research with “research and development” (“R&D”). Within a few decades this new inclusive concept of “research” had to a large extent taken over the role of the traditional concept of “science” in public discourse. However, the OECD definitions which were introduced in the 1960s, still serve as the basis for international research statistics: R&D is a term covering three activities: basic research, applied research and experimental development. … Basic research is experimental or theoretical work undertaken primarily to acquire new knowledge of the underlying foundation of phenomena and observable facts, without any particular application or use in view. Applied research is also original investigation undertaken in order to acquire new knowledge. It is, however, directed primarily towards a practical aim or objective. Experimental development is systematic work, drawing on existing knowledge gained from research and/or practical experience that is directed to producing new materials, products or devices, to installing new processes, systems and services, or to improving substantially those already produced or installed (OECD 1981: 25).

#### Dangerous research is all applied science

Wolpert 2 [Lewis Wolpert (Dept. of Anatomy and Developmental Biology

University College London), "Is Science Dangerous?" 2002] AZ

Yet, reliable scientific knowledge is value-free and has no moral or ethical value. Science tells us how the world is. That we are not at the centre of the universe is neither good nor bad, nor is the possibility that genes can influence our intelligence or our behaviour. Dangers and ethical issues only arise when science is applied as technology. However ethical issues can arise in actually doing the scientific research, such as doing experiments on humans or animals, as well as issues related to safety The problem is the conflation of science and technology. The distinction between science and technology, between knowledge and understanding on the one hand, and the application of that knowledge to making something, or using it in some practical way, is fundamental. Science produces ideas about how the world works, whereas the ideas in technology result in usable objects. Technology is much older than anything one could regard as science and unaided by any science.

## Add-ons

### 1AR A/O – Sci Diplomacy

#### Government controls crush foreign cooperation

Knezo 6 (Genevieve J. Knezo – Specialist in Science and Technology Policy Resources, Science, and Industry Division + this is a CRS Report for Congress, pgs. 36 – 53, “Controls on Unclassified Biological Research Information”, “’Sensitive But Unclassified’ Information and Other Controls: Policy and Options for Scientific and Technical Information”, https://fas.org/sgp/crs/secrecy/RL33303.pdf)

Some say that placing controls on unclassified information could negatively affect governmental relations with the private sector and procurement for information technology and other contracts. New ideas for information security technologies, including hard technology, software and biotech-related products, often come from overseas, as do bids for contracts to handle sensitive agency information. Reportedly, foreign vendors will have trouble complying with contracts that need to meet information security standards. It has been reported that requests for proposals (RFPs) coming from the Defense Security Services involving data processing for its SBU information say that employees of potential vendors need to be U.S. citizens, with background checks. DHS and DOT procurement rules involving sensitive information specify background checks for prime or subcontractors and that nondisclosure forms have to be signed.226 There is also the view that scientists who voluntarily agree to pre-research and prepublication reviews of research articles could harm a university’s ability to conduct fundamental research involving foreigners as permitted by National Security Decision Directive-189 (NSDD-189) and related regulations. (For additional information, see a previous section of this report entitled “Summary of Federal Policies to Classify or Control Scientific and Technical Information.” According to Robert Hardy of the nonprofit Council on Governmental Relations ... by placing restrictions on publishing ... the [Department of Homeland Security-funded centers of excellence] could risk losing the privileges that universities enjoy because they do fundamental research — defined a work whose results are ‘published and shared broadly within the scientific community.’ One important privilege is being able to involve foreign nationals in any research project without obtaining a government license.227

#### Science diplomacy solves a laundry list of impacts

Federoff 8 [Nina, Science and Technology Adviser to the Secretary of State, http://www.gpo.gov/fdsys/pkg/CHRG-110hhrg41470/html/CHRG-110hhrg41470.htm]

Chairman Baird, Ranking Member Ehlers, and distinguished members of the Subcommittee, thank you for this opportunity to discuss science diplomacy at the U.S. Department of State**.** The U.S. is recognized globally for its leadership in science and technology. Our scientific strength is both a tool of ``soft power''--part of our strategic diplomatic arsenal--and a basis for creating partnerships with countries as they move beyond basic economic and social development. Science diplomacy is a central element of the Secretary's transformational diplomacy initiative, because science and technology are essential to achieving stability and strengthening failed and fragile states. S&T advances have immediate and enormous influence on national and global economies, and thus on the international relations between societies. Nation states, nongovernmental organizations, and multinational corporations are largely shaped by their expertise in and access to intellectual and physical capital in science, technology, and engineering. Even as S&T advances of our modern era provide opportunities for economic prosperity, some also challenge the relative position of countries in the world order, and influence our social institutions and principles. America must remain at the forefront of this new world by maintaining its technological edge, and leading the way internationally through science diplomacy and engagement. The Public Diplomacy Role of Science Science by its nature facilitates diplomacy because it strengthens political relationships, embodies powerful ideals, and creates opportunities for all. The global scientific community embraces principles Americans cherish**:** transparency, meritocracy, accountability, the objective evaluation of evidence, and broad and frequently democraticparticipation**.** Science is inherently democratic, respecting evidence and truth above all. Science is also a common global language, able to bridge deep political and religious divides. Scientists share a common language. Scientific interactions serve to keep open lines of communication and cultural understanding. As scientists everywhere have a common evidentiary external reference system, members of ideologically divergent societies can use the common language of science to cooperatively address both domestic and the increasingly trans-national and global problems confronting humanity in the 21st century. There is a growing recognition that science and technology will increasingly drive **t**he successful economies of the 21st century. Science and technology provide an immeasurable benefit to the U.S. by bringing scientists and students here, especially from developing countries, where they see democracy in action, make friends in the international scientific community, become familiar with American technology, and contribute to the U.S. and global economy. For example, in 2005, over 50 percent of physical science and engineering graduate students and postdoctoral researchers trained in the U.S. have been foreign nationals. Moreover, many foreign-born scientists who were educated and have worked in the U.S. eventually progress in their careers to hold influential positions in ministries and institutions both in this country and in their home countries. They also contribute to U.S. scientific and technologic development: According to the National Science Board's 2008 Science and Engineering Indicators, 47 percent of full-time doctoral science and engineering faculty in U.S. research institutions were foreign-born. Finally, some types of science--particularly those that address the grand challenges in science and technology--are inherently international in scope and collaborative by necessity. The ITER Project, an international fusion research and development collaboration, is a product of the thaw in superpower relations between Soviet President Mikhail Gorbachev and U.S. President Ronald Reagan. This reactor will harness the power of nuclear fusion as a possible new and viable energy source by bringing a star to Earth. ITER serves as a symbol of international scientific cooperation among key scientific leaders in the developed and developing world--Japan, Korea, China, E.U., India, Russia, and United States--representing 70 percent of the world's current population. The recent elimination of funding for FY08 U.S. contributions to the ITER project comes at an inopportune time as the Agreement on the Establishment of the ITER International Fusion Energy Organization for the Joint Implementation of the ITER Project had entered into force only on October 2007. The elimination of the promised U.S. contribution drew our allies to question our commitment and credibility in international cooperative ventures. More problematically, it jeopardizes a platform for reaffirming U.S. relations with key states. It should be noted that even at the height of the cold war, the United States used science diplomacy as a means to maintain communications and avoid misunderstanding between the world's two nuclear powers--the Soviet Union and the United States. In a complex multi-polar world, relations are more challenging, the threats perhaps greater, and the need for engagement more paramount. Using Science Diplomacy to Achieve National Security Objectives The welfare and stability of countries and regions in many parts of the globe require a concerted effort by the developed world to address the causal factors that render countries fragile and cause states to fail. Countries that are unable to defend their people against starvation, or fail to provide economic opportunity, are susceptible to extremist ideologies, autocratic rule, and abuses of human rights. As well, the world faces common threats, among them climate change, energy and water shortages, public health emergencies, environmental degradation, poverty, food insecurity, and religious extremism. These threats can undermine the national security of the United States, both directly and indirectly. Many are blind to political boundaries, becoming regional or global threats. The United States has no monopoly on knowledge in a globalizing world and the scientific challenges facing humankind are enormous. Addressing thesecommonchallenges demands common solutions and necessitates scientific cooperation, common standards, and common goals. We must increasingly harness the power of American ingenuity in science and technology through strong partnerships with the science community in both academia and the private sector, in the U.S. and abroad among our allies, to advance U.S. interests in foreign policy.

### 1AR A/O – Econ

#### Public funding for basic research grows the economy a lot

Salter & Martin 1 [Ammon J. Salter (Professor in Innovation at the University of Bath), Ben R. Martin,"The economic benefits of publicly funded basic research: a critical review," 2001] AZ

In this study, we have critically reviewed the literature on the economic benefits of publicly funded research. As we have seen, this literature falls into three main categories. One consists of econometric studies, where there have been numerous attempts to estimate the impact of research in general on productivity. Virtually all have found a positive rate of return, and in most cases the figure has been comparatively high. However, these attempts have been beset with both measurement difficulties and conceptual problems such as the assumption of a simple production function model of the science system. In particular, they tend to assume that research is, first and foremost, a source of useful information to be drawn upon in the development of new technologies, products and processes. This ignores the other forms of economic benefit discussed in Section 5. As regards the specific case of basic research, one can try to estimate the rate of return but only on the basis of very questionable assumptions. Mansfield’s work suggests there is a very substantial rate of return, but the precise figure he arrives at 28% is open to some doubt. Among the problems are the complementary linkages of basic research activities with much larger ‘downstream’ investments in development, production, marketing and diffusion; and the complex and often indirect contributions of basic research to technology, the balance of which varies greatly across scientific fields and industrial sectors. Recent work by Narin et al. 1997 based on the scientific papers cited in patents provides a tool for mapping these linkages and suggests that the knowledge flow from US science to US industry is substantial and growing rapidly, although this finding is again subject to certain methodological reservations. The econometric literature on localisation effects and spillovers emphasises that advanced industrial countries need their own, well developed basic research capabilities in order to appropriate the knowledge generated by others and to sustain technological development. Personal links and mobility are vital in integrating basic research with technological development. This, in turn, highlights the importance of linking basic research to graduate training, a point to which we return later. Surveys and case studies of different forms of economic benefit from basic research represent the two other types of literature reviewed here, and these have yielded a number of findings. One concerns the traditional justification for the public funding of basic research which is based on the argument that science is a public good, with the emphasis being on the role of basic research as a source of new useful knowledge, especially in a codified form. However, numerous studies have shown that there are several other forms of economic benefit from basic research, and that new useful knowledge is not necessarily the principal type of benefit. This review has proposed a classification scheme based on six categories of benefit.1

## Solvency Blocks

### A2 Other Funding Sources Also Bad

#### DoD is the main offender

FDP 08 [(Federal Demonstration Partnership) “RESTRICTIONS ON RESEARCH AWARDS: TROUBLESOME CLAUSES 2007/2008” A REPORT OF THE COUNCIL ON GOVERNMENTAL RELATIONS (COGR) ASSOCIATION OF AMERICAN UNIVERSITIES (AAU) July 2008] AZ

The following recommendations are highlighted in no particular order by COGR-AAU as among those that could assist government agencies to balance legitimate concerns of national security while enabling universities to navigate quickly and effectively the government contracting process. Implementation of these recommendations would help avoid lengthy negotiations and reduce the possibility of burdensome restrictions that force universities to reject awards. 1. Both the previous and present surveys identified the Department of Defense (DOD) as the largest source of troublesome clauses. The previous COGR-AAU report recommended that DOD revise the Defense Federal Acquisition Regulations Supplement (DFARS) prescription guidance to prevent the DFARS 7000 clause from being used in contracts for university research, either directly or as a flow down from industry contracts. Just as important, DOD should revise its guidance to contracting officers stipulating that no controls should be imposed on publications or foreign national participation for fundamental research either in direct awards or sub-awards.

## Counterplan Blocks

### A2 USFG CP

#### Plan is key – academic freedom is a social compact which requires widespread consensus [solvency deficit to USFG CP]

\*careful since it might conflict with answers to T – Not Research

Brandt 6 [Elizabeth Barker Brandt (Professor of Law, University of Idaho), "The Crumbling Academic Freedom Consensus and the Threat of U.S. Anti-terrorism Policy," Forum on Public Policy, Summer 2006] AZ

Academic freedom is a social compact. Its continued vitality is dependent not on law, but rather, on the willingness of those involved in the academic enterprise to adhere to its core ideas and the willingness of those outside the academic enterprise to refrain from undue interference3 While some aspects of academic freedom intersect the law of contracts and the protection of free speech, its core ideals do not find roots in legal soil. If academics (both administrators and faculty) lose track of their commitment to academic freedom, if they fail to explain and defend the concept to those outside the academic enterprise, or if those third parties no longer feel constrained to intervene in decisions of the academy, academic freedom as it has been understood will not survive. Higher Education will survive, but it will be fundamentally changed -- it will look more like private research entities, schools of vocational education, and ideological think tanks. Research and teaching agendas will be determined more directly by vocational needs and by political strategy, and will be controlled by market forces and politics. Our higher education system will resemble the stultified and passive system described by de George. American universities were built on the foundation of academic freedom from their beginnings at the end of the 19th century, in what Walter Metzger calls the “university movement.”4 The modern university emerged, in part, from the concerted effort of a small groups of academics to reproduce the German research university in the United States.5 At the same time, early liberal arts colleges began to separate themselves from dominance by their founding churches.6 Both movements contributed to the developing ideal of academic freedom. By the middle of the 19th Century, the German research universities had embraced the ideas of lerhfreiheit (“the freedom of teaching and freedom of inquiry”)7 and lernfreiheit (“the absence of administrative coercions in the learning situation”).8 These universities were conceived as a places where scholars pursued truth, formulated and transmitted it to students and where students themselves, learned to pursue truth9 . In the U.S., by the end of the 19th Century leading universities were modeled explicitly on the German ideal. Johns Hopkins University, the first of such institutions, was dedicated to the unity of teaching and research – the notion that students should be taught by teachers engaged in the study and exploration of the fields in which they taught.10 The first president of the University of Chicago, another school that emerged during this period, expressly sought to replicate the model of the “Humboldtian university”11 embracing the unity of teaching and research, freedom of teaching and academic self-governance.12 While schools such as Johns Hopkins and the University of Chicago were conceived as new endeavors other American universities developed from previously church dominated schools for the training of ministers. The emergence of these schools as modern universities was characterized by a rejection of external regulation and dominance by the churches they served.13 Early academic freedom arguments that arose in the context of these sectarian institutions were often phrased as religious liberty arguments.14 Only when these colleges shed their domination by sectarian and denominational forces, did the modern university become possible.15 The university that emerged from these developments was characterized by three principles. Research would inform teaching and not be conducted as a separate endeavor. Teaching would be governed only by the convictions of a scholar based on research and study. The endeavors of teaching and research would take place in an environment free from domination by the churches and free of government regulation and control. These principles – the centrality of research, freedom of teachers to determine what to teach, and the freedom of universities from external regulation and control of their activities -- are the core ideas of academic freedom. These principles embody the freedom of the university as an institution to provide education, foster research, and sponsor service, free from intervention by those outside its governance. They also include the freedom of teachers and researchers to work within the scope of their assignments subject to regulation based only on standards of professional ethics.16 These freedoms are core to the functioning of universities as we have know them for they ensure that universities are neither a tool of prevailing power structure nor a place for the indoctrination of established dogma. Rather academic freedom ensures that research and teaching take place in an environment of free thought, experimentation and creativity. Ideas that appear radical and unjustified to one generation can become generally accepted principles to the next. Ideas that appear central are discarded as false by later inquirers. If the development and teaching of radical ideas of some could be stifled or officially discredited, or if the core principles of one generation can be the dogma of the next, this system of inquiry and questioning that leads to the advancement of knowledge would disintegrate.

#### This counterplan is a textbook example of object fiat – that's a voting issue

#### Steals aff ground and avoids all debate over the nuance of the aff policy

#### Logic – no rational actor can choose between what the DoD does and public universities

### A2 PICs – Top Level

#### Perm do both – the aff merely bans the existence of free speech zones – it doesn't protect [ ] speech on campuses

#### Reject negative counterplans that ban hate speech but allow other constitutional speech

1. Predictability – there are a potentially infinite number of offensive words or types of speech that the neg can PIC out of – makes being aff impossible since we have to defend every single type of speech
2. Strat skew – they skirt the core controversy of the topic by mooting the majority of the 1AC – rather than debating the value of free speech on campuses

#### Voter for fairness – it's constitutive of any game

### A2 Exclude White People CP

#### Perm do the CP – it does the entirety of the plan by removing speech zones and then adds an extra condition

#### Authenticity DA – forces people of color to "prove" that they aren't white – [explain]

#### Turn – the CP allows the administration to persecute movements

#### Regulating speech based on group identity is impossible and promotes dangerous stereotypes – race is socially constructed and any attempt to draw lines around a group's speech would fail

Post 91 [Robert Post (Professor of Law, School of Law (Boalt Hall), University of California at Berkeley. B.A., Harvard College, 1969; J.D., Yale University, 1977; Ph.D., Harvard University, 1980), "Racist Speech, Democracy, and the First Amendment," 1991] AZ

This lack of closure may of course be threatening, for it casts the creation of group identity upon the uncertain currents of public discourse. The safe harbor of legal regulation may, by contrast, appear to promise members of minority groups more secure control over the meaning of their social experience. But that promise is illusory, for it is profoundly inconsistent with the analysis of racism prevalent in the contemporary literature. To the extent that racism is viewed as pervasive among whites, and to the extent that whites, as a dominant group, can be expected to hold the levers of legal power, there would seem little reason to trust the law to establish socially acceptable meanings for race. Such meanings cannot be determined by reference to easy or bright-line distinctions, as for example those between positive or negative ascriptions of group identity. The work of figures as diverse as William Julius Wilson,es Shelby Steele,159 and Louis Farrakhan160 illustrates how highly critical characterizations of racial groups can nevertheless serve constructive social purposes. To vest in an essentially white legal establishment the power to discriminate authoritatively among such characterizations and purposes would seem certain to be disempowering. The conclusion that group harm ought not to justify legal regulation is reflected in technical first amendment doctrine in the fact that virtually all communications likely to provoke a claim of group harm will be privileged as assertions of evaluative opinion. 162 The following language, for example, gave rise to legal liability in Beauharnais: "If persuasion and the need to prevent the white race from becoming mongrelized by the negro will not unite us, then the aggressions . . rapes, robberies, knives, guns and marijuana of the negro, SURELY WILL."'163 Justice Frankfurter interpreted this language as a false factual assertion: "No one will gainsay that it is libelous falsely to charge another with being a rapist, robber, carrier of knives and guns, and user of marijuana."' 164 This interpretation, however, seems plainly incorrect. To accuse an individual of using marijuana is to assert that she has committed certain specific acts, but to accuse the group "blacks" of using marijuana is not to make an analogous assertion. Some blacks will have used marijuana, and most will not have. The question is thus not the existence of certain specific acts, but rather whether those acts can appropriately be used to characterize the group. The fundamental issue is the nature of the group's identity, an issue that almost certainly ought to be characterized as one of evaluative opinion. Because the social meaning of race is inherently controversial, most statements likely to give rise to actions for group harm will be negative assessments of the identity of racial groups, and hence statements of evaluative opinion. No serious commentator would advocate a trial to determine the truth or falsity of such statements; the point is rather that such statements should not be made at all because of the deep injury they cause. But in a context in which group identity is a matter for determination through political struggle and disagreement, the hypostatized injury of a group cannot, consistent with the processes that instantiate the principle of self-determination, be grounds to legally silence characterizations of group identity within public discourse.

### A2 "Single College" PICs

#### The plan's firewall protection of student activism is key – individual colleges affect the overall network of activism through spillover

van Dyke 98 [Nella van Dyke (Professor of Sociology at UC Merced), "Hotbeds of Activism: Locations of Student Protest," Social Problems, 1998] AZ

The analyses support the hypothesis that schools that experience movement activity related to one issue will experience protest related to multiple issues. The presence of activity around one movement on campus in the 1960s was related to the later emergence of activity around other issues, or movements, on that same campus. The earlier presence of SDS chapters on campus was significantly associated with the later participation of students in SNCC's Freedom Summer campaign, and the presence of earlier Freedom Summer volunteers on campus was associated with the later development of new SDS chapters. These findings demonstrate the interconnectedness of different social movements, and suggest that a network of activists, interested in a variety of issues, supported each other during the 1960s. The civil rights movement not only influenced the subsequent movements of the decade; the student movement supported and influenced the civil rights movement. These findings suggest that social movement communities, or expanded activist subcultures, influence the incidence of protest activity. This finding also has implications for the study of social change. Ideas did not flow unidirectionally from one movement to another, but were negotiated by the individuals active on different issues. Social movement scholars argue that the civil rights movement influenced all other movements in the decade. There is little doubt that it did, however, my research suggests a more reciprocal relationship. The civil rights movement and other movements had common members who influenced each other and the organizations to which they belonged. The research presented in this paper suggests that social movement scholars should continue to expand their conception of social movements, recognizing that movements within a cycle of protest are not discrete entities. As McAdam (1994) has suggested, individual movements are inseparable from the other movements active within a protest cycle, forming movement families. Subcultures of activists link different movements within a cycle of protest, and influence the emergence of activism around different issues at the same location. Studies that focus exclusively on networks of activists involved in a single organization or movement fail to capture the cultural processes associated with these networks. The analysis presented here confirms that these subcultures are not confined to a single movement or issue, especially during cycles of protest. Nor is their influence confined temporally; they may exert an influence over decades. Tarrow (1994) and McAdam (1994) have suggested that we should focus on movement cycles as our units of analysis rather than on individual movements. While I believe this is on target, my research suggests that we will miss important processes if we limit our attention to temporally bounded periods of heightened protest. The emergence of protest in a given period is influenced by the past.

### A2 Software PIC

#### Court precedent lacks a clear definition of whether code is speech – software shouldn't be considered speech since it isn't expressive

Tutt 12 [Andrew Tutt (Attorney-Adviser, Office of Legal Counsel at U.S. Department of Justice), "Software Speech," Stanford Law Review, November 2012] AZ

The Court should disregard both of these approaches and chart a new course with respect to software. To enact a sound information policy, the Court should neither embrace a seemingly absurd result (as Sorrell would counsel) nor look to narrow analogies (as Brown would counsel) and instead look to the broader and more difficult question of the degree to which a class or category of new media implicates the First Amendment’s core purposes. Rather than counseling greater protection from governmental interference, this may in fact suggest that the government have a freer hand in content-neutral software regulation. Software is sometimes primarily concerned with conveying ideas of the kind and in a manner that one would recognize as familiar and essential to a free society. At other times, software functions much more like a means by which data is gathered, manipulated, and relayed to and by a user and therefore difficult to think of as akin to “speech.” Software, in other words, should be considered not for what it is or even what it says but for what it means to society to treat it like speech. Whether operating systems, search engines, and word processors are “speech” depends on the position these categories occupy within our democracy. Whereas operating systems, word processors—even search engines—are not recognized as occupying a similar expressive position. At least not yet. To see how this already comports with how we think about speech in the real world, one need only think of a urinal in an art gallery. What makes it “art” and therefore “speech” is a constellation of cultural phenomena that coalesce to render an otherwise intellectually inert and uninteresting object meaningful. The unit of expression—the gallery, the artist—is the source of meaning. To take the urinal from the gallery and the artist from the urinal is to take from it its claim to First Amendment protection. Now consider videogames. An independent developer creates a game that simply flashes “this is not a game” repeatedly. While probably among the least fun “games” in the world, we nonetheless see that its very status as a videogame conveys something important about it, some indicia of expressiveness—even if the game expresses little or nothing at all. Newspapers and other media are similarly culturally contingent in their claim to First Amendment protection. When a newspaper, newsletter, book, or pamphlet is published or simply handed out on a street corner, we do not need to know what is in it—it could just as well be blank—to know that it is worthy of the First Amendment’s protection. Operating systems, word processors, and search engines are not like that. There is no understanding of these categories—as categories—as expressively important. Bearing only nascent meaning, they lack the cultural positioning to obtain the First Amendment’s most extraordinary protections and for that reason should probably fall on the other side of the “pure speech” line.

### A2 Commercial/Advertising PIC

#### Commercial speech isn't protected—"constitutionally protected speech" is a term-of-art distinct from commercial speech

Evans 14 [Barbara Evans (Professor of Law and George Butler Research Professor; director of the Center for Biotechnology & Law, University of Houston Law Center), "The First Amendment Right to Speak About the Human Genome," 2014] AZ

First Amendment doctrine recognizes three categories of speech, with the degree of First Amendment protection a particular communication receives depending on which category of speech is involved. The first category (“regulable speech”) includes various types of communication that lie largely outside of First Amendment protection and can be regulated by the government, whether through state or federal statutes and regulations or through state common law (e.g., tort lawsuits). Scholars disagree about the breadth of speech activity that is regulable.195 This disagreement is largely immaterial to this discussion because common candidates for regulable speech— things like “defamation, incitement, obscenity, and pornography produced with real children”196—obviously have nothing to do with the return of genetic test results. Two categories of speech regulation are, however, potentially relevant to this discussion and will be examined in greater detail below. These are: (1) professional speech— that is, the speech that lawyers, doctors, and other licensed professionals provide to clients and patients in the course of providing professional services,197 and (2) speech regulation—particularly, regulation of health claims—that occurs pursuant to consumerproduct safety and other health and safety regulations.198 The second category is commercial speech, which enjoys a measure of First Amendment protection199 although the government has a constrained (but still considerable) power to regulate it.200 Commercial speech has been described as “speech proposing a commercial transaction”201 or “speech … related to the economic interests of the speaker and its audience,”202 and it includes such things as advertising,203 creating and disseminating health records as part of a data-mining business,204 and making health claims about a product (for example, claiming that a vitamin prevents cancer or reduces the risk of neural tube defects).205 The third category is pure speech206 (also called noncommercial speech, core First Amendment speech, or fully protected speech) that receives the most robust constitutional protection. Scholars disagree about the precise scope of fully protected speech,207 but there is general agreement that it includes, at the very least, such things as political speech— “[d]iscussion of public issues”208 and the “unfettered interchange of ideas for the bringing about of political and social changes desired by the people”209—as well as artistic expression and scholarly and scientific debate.210

#### Prefer this interpretation of "constitutionally protected speech" for limits – anything else massively expands PIC ground, allowing the neg to specify any form of sale, donation, or advertising to PIC out of – kills engagement

### A2 Hate Speech PIC

#### Perm do both – the aff merely bans the existence of free speech zones that physically confine speech to zones – it doesn't protect hate speech on campuses

#### Judicial precedence is already in place to distinguish between constitutionally protected speech and hate speech. Brown v. Board of Education proves.

Lawrence 4 IF HE HOLLERS LET HIM GO: REGULATING¶ RACIST SPEECH ON CAMPUS¶ CHARLES R. LAWRENCE III, 1993, Professor of Law, Stanford Law School, Stanford University. B.A., 1965, Haverford College;¶ J.D., 1969, Yale Law School

The landmark case of Brown v. Board of Education is not a case we¶ normally think of as a case about speech. As read most narrowly, the¶ case is about the rights of black children to equal educational opportunity.¶ But Brown can also be read more broadly to articulate a principle¶ central to any substantive understanding of the equal protection clause,¶ the foundation on which all anti-discrimination law rests. This is the¶ principle of equal citizenship. Under that principle "every individual is¶ presumptively entitled to be treated by the organized society as arespected, responsible, and participating member."' 36 Furthermore, it requires¶ the affirmative disestablishment of societal practices that treat people¶ as members of an inferior or dependent caste, as unworthy to¶ participate in the larger community. The holding in Brown-that¶ racially segregated schools violate the equal protection clause-reflects¶ the fact that segregation amounts to a demeaning, caste-creating¶ practice. 37¶ The key to this understanding of Brown is that the practice of segregation,¶ the practice the Court held inherently unconstitutional, was¶ speech. Brown held that segregation is unconstitutional not simply because¶ the physical separation of black and white children is bad38 or because¶ resources were distributed unequally among black and white¶ schools. 39 Brown held that segregated schools were unconstitutional primarily¶ because of the message segregation conveys-the message that¶ black children are an untouchable caste, unfit to be educated with white¶ children. 4° Segregation serves its purpose by conveying an idea. It¶ stamps a badge of inferiority upon blacks, and this badge communicatesa message to others in the community, as well as to blacks wearing the¶ badge, that is injurious to blacks. Therefore, Brown may be read as regulating¶ the content of racist speech. As a regulation of racist speech, the¶ decision is an exception to the usual rule that regulation of speech content¶ is presumed unconstitutional. 41¶ A. The Conduct/Speech Distinction¶ Some civil libertariang argue that my analysis of Brown conflates¶ speech and conduct. They maintain that the segregation outlawed in¶ Brown was discriminatory conduct, not speech, and the defamatory¶ message conveyed by segregation simply was an incidental by-product of¶ that conduct. This position is often stated as follows: "Of course segregation¶ conveys a message but this could be said of almost all conduct. To¶ take an extreme example, a murderer conveys a message of hatred for¶ his victim. [But], we would not argue that we can't punish the murderthe¶ primary conduct-merely because of this message which is its secondary¶ byproduct."'42 This objection to my reading of Brown misperceives¶ the central point of the argument. I have not ignored the distinction¶ between the speech and conduct elements of segregation by mistake.¶ Rather, my analysis turns on that distinction. It asks the question¶ whether there is a purpose for outlawing segregation that is unrelated to¶ its message,43 and it concludes the answer is "no." If, for example, John W. Davis, counsel for the Board of Education¶ of Topeka, Kansas, had been asked during oral argument in Brown to¶ state the Board's purpose in educating black and white children in separate¶ schools, he would have been hard pressed to answer in a way unrelated¶ to the purpose of designating black children as inferior.44 If¶ segregation's primary goal is to convey the message of white supremacy,¶ then Brown's declaration that segregation is unconstitutional amounts to¶ a regulation of the message of white supremacy.45 Properly understood,¶ Brown and its progeny require that the systematic group defamation of¶ segregation be disestablished. 46 Although the exclusion of black children¶ from white schools and the denial of educational resources and association¶ that accompany exclusion can be characterized as conduct, these¶ particular instances of conduct are concerned primarily with communicating¶ the idea of white supremacy. The non-speech elements are byproducts¶ of the main message rather than the message simply a by-product¶ of unlawful conduct. 47The public accommodations provisions of the Civil Rights Act of¶ 196448 provide another example illuminating why laws against discrimination¶ are also regulation of racist speech. The legislative history and the¶ Supreme Court's opinions upholding the Act establish that Congress was¶ concerned that blacks have access to public accommodations to eliminate¶ impediments to the free flow of interstate commerce, 49 but this purpose¶ could have been achieved through a regime of separate-but-equal accommodations.¶ Title II goes further; it incorporates the principal of the inherent¶ inequality of segregation, and prohibits restaurant owners from¶ providing separate places at the lunch counter for "whites" and¶ "coloreds." Even if the same food and the same service are provided,¶ separate-but-equal facilities are unlawful. If the signs indicating separate¶ facilities remain in place, then the statute is violated despite proof that¶ restaurant patrons are free to disregard the signs. 50 Outlawing these¶ signs graphically illustrates my point that anti-discrimination laws are¶ primarily regulations of the content of racist speech.

#### Hate speech restrictions created by those in positions of power are more likely to hurt than help the oppressed.

Glasser 16 Ira Glasser (Former executive director of the American Civil Liberties Union, now president of the board of directors of the Drug Policy Alliance), quoted in “HATE SPEECH IS FREE SPEECH” by Jonothan Haidt, Spiked, 6/12/16, http://www.spiked-online.com/newsite/article/hate-speech-is-free-speech/18444#.WE5XNM6gTds //[LADI](http://www.theladi.org/evidence)

How is ‘hate speech’ defined, and who decides which speech comes within the definition? Mostly, it’s not us. In the 1990s in America, black students favoured ‘hate speech’ bans because they thought it would ban racists from speaking on campuses. But the deciders were white. If the codes the black students wanted had been in force in the 1960s, their most frequent victim would have been Malcolm X. In England, Jewish students supported a ban on racist speech. Later, Zionist speakers were banned on the grounds that Zionism is a form of racism. Speech bans are like poison gas: seems like a good idea when you have your target in sight — but the wind shifts, and blows it back on us.

#### Allowing hate speech is key to targeting and stopping it – they merely push the problem further underground.

Haider 16 Sarah Haider, quoted in “HATE SPEECH IS FREE SPEECH” by Jonothan Haidt, Spiked, 6/12/16, <http://www.spiked-online.com/newsite/article/hate-speech-is-free-speech/18444#.WE5XNM6gTds> //[LADI](http://www.theladi.org/evidence)

Progress depends on our freedom to express dangerous ideas – a freedom which relies on a strict differentiation between speech and physical acts. Hate-speech policies blur this line; they categorise speech that offends as in itself a form of violence, thereby unwittingly justifying violence as a response to offensive speech. Where once speech was punishable if it insulted the dignity of God, now speech that insults the dignity of His followers can be censored. It is a modern blasphemy, grounded not in scripture, but in the shifting sands that are the feelings of individuals. Censoring hate speech merely pushes hate underground, where it lurks beneath the guise of civility: invisible but not obliterated, looming all the more powerful. Genuine crusaders against prejudice now have a shadow for an enemy: impossible to target, and thus impossible to dismantle.

#### Reject negative counterplans that ban hate speech but allow other constitutional speech

1. Predictability – there are a potentially infinite number of offensive words or types of speech that the neg can PIC out of – makes being aff impossible since we have to defend every single type of speech
2. Strat skew – they skirt the core controversy of the topic by mooting the majority of the 1AC – rather than debating the value of free speech on campuses

#### Voter for fairness – it's constitutive of any game

### A2 Animal Cruelty PIC

#### Crush videos are considered obscenity – not protected

Shadwick 15 [Lana Shadwick, "Couple Back to Court in Texas for ‘Animal Crush Videos’," Breitbart, 3/25/2015] AZ

The Court of Appeals made note that the First Amendment does allow for some restrictions on free speech. It included obscenity as an example. The Court ruled the law is constitutional in this application because it focuses on the “secondary effects” of the video and not the actual content. “The other element that occurs in animal crush videos and which warrants a higher punishment than simple obscenity is that it involved the intentional torture or pain to a living animal. Congress finds this combination deplorable and worthy of special punishment,” Judge Stephen Higginson wrote for the three-judge panel (ruling attached below).

## A2 Disads

### A2 Bioterror DA – TL

#### No link – applied vs basic research

Knezo 6 (Genevieve J. Knezo – Specialist in Science and Technology Policy Resources, Science, and Industry Division + this is a CRS Report for Congress, pgs. 36 – 53, “Controls on Unclassified Biological Research Information”, “’Sensitive But Unclassified’ Information and Other Controls: Policy and Options for Scientific and Technical Information”, https://fas.org/sgp/crs/secrecy/RL33303.pdf)

National Security Decision Directive-189 (NSDD-189), titled “National Policy on the Transfer of Scientific, Technical and Engineering Information” and issued on Sept. 21, 1985, says that if federally funded basic scientific and technical information produced at colleges, universities and laboratories is to be controlled for national security reasons, it should be classified. But, “... to the maximum extent possible, the products of fundamental research remain unrestricted. It is also the policy ... that, where the national security requires control, the mechanism for control of information generated during Federally funded fundamental research in science, technology, and engineering at colleges, universities, and laboratories is classification.” “Fundamental research” is defined as “basic and applied research in science and engineering, the results of which ordinarily are published and shared broadly within the scientific community....” This policy is reflected in Executive Order 12958. NSDD-189 is still in effect, as stated in a letter from the National Security Advisor to the Center for Strategic and International Studies (Issued by National Security Advisor Condoleezza Rice on November 1, 2001).

#### Open circulation of research results is key to innovation that allows scientists to stay one step ahead of terrorists – that's 1AC Knezo.

#### Turn – open research is more likely to help the public counter terrorism rather than help the terrorists–truly dangerous research is already filtered out

Knezo 6 (Genevieve J. Knezo – Specialist in Science and Technology Policy Resources, Science, and Industry Division + this is a CRS Report for Congress, pgs. 36 – 53, “Controls on Unclassified Biological Research Information”, “’Sensitive But Unclassified’ Information and Other Controls: Policy and Options for Scientific and Technical Information”, https://fas.org/sgp/crs/secrecy/RL33303.pdf)

In addition, at the first NSABB meeting, some members suggested that instead of formal restrictions, ethics education for researchers would suffice to deal with potential problems.193 Others suggest that controls on biological research information could constrain the exchange of information needed to develop effective defenses against dangerous pathogens.194 A National Academies report, Seeking Security; Pathogens, Open Access and Genomic Data Bases, published in 2004, that had been requested by the National Science Foundation and the Central Intelligence Agency, concluded that there should be no change in current policies that allow scientists and the public unrestricted access to genome data on microbial pathogens. Access, it concluded, improves the nation’s ability to fight both bioterrorism and naturally occurring infectious diseases.195 Open access to raw sequence data is unlikely to help bioterrorists develop weapons, and preventing distribution of such information could hurt research to prevent bioterrorism and emerging diseases such as severe acute respiratory syndrome (SARS). Genomic information about most dangerous pathogens is already available, it said, and if the government wants to restrict distribution of information in the future, such information should be classified. The report concluded that security against bioterrorism would be achieved best by policies that facilitate, not limit, the free flow of this information. In May 2005, the DHHS attempted to prevent the National Academy of Sciences from publishing an article in the Proceedings of the National Academy of Sciences on how the U.S. milk supply could be tainted with botulism and control measures to prevent it. The Academy published it on the grounds that the benefits of publishing the paper giving biodefense guidance outweighed any threats.196 Other nations and international scientific groups have addressed this issue. For instance, reportedly a December 13, 2004 paper issued jointly by the United Kingdom’s Royal Society and the Wellcome Trust urged caution on government intervention. The joint paper said “government should ask scientific societies and funding institutions to take more responsibility for vetting and preventing the dissemination of risky technical details. The paper suggested that grant review forms could include a check box for bioterror issues to ensure that they are considered.”197 Also, at a meeting in June 2005 in Geneva, life scientists from several countries sought to develop a code of conduct. Biosafety in life sciences research was also a topic of discussion at an Organization for Economic Cooperation and Development (OECD) International “futures” program meeting in September 2004, and the National Academies held an International Forum on Biosecurity in Como, in March 2005 to discuss convergence on codes of conduct and oversight of biosecurity research.19

#### No bioterror

Jefferson, et al, 14 [ Catherine, 21 August 2014 | doi: 10.3389/fpubh.2014.00115, Synthetic biology and biosecurity: challenging the “myths”, Catherine, Jefferson, imageFilippa Lentzos and imageClaire Marris\* Department of Social Science, Health and Medicine, King’s College London, London, UK, Catherine joined SSHM in January 2013. Before joining the department, she worked as a senior policy advisor for international security at the Royal Society, where she led a project on Neuroscience, Conflict and Security. Prior to this she was a research fellow with the Harvard Sussex Program on Chemical and Biological Weapons at the University of Sussex, where she also obtained her DPhil. Catherine’s research interests are focused on the intersection of science and security policy, with a particular emphasis on chemical and biological security, dual use governance of emerging technologies and the growth of the amateur biology community. She is currently involved in research on the social dimensions of synthetic biology within theCentre for Synthetic Biology and Innovation, <http://journal.frontiersin.org/Journal/10.3389/fpubh.2014.00115/full>]

Challenges to Myth 5 There are two dimensions to Myth 5. The first is about the intention of would-be terrorists, and the assumption is that terrorists would seek to produce mass casualty weapons and pursue capabilities on the scale of twentieth century state-level bioweapons programs. While most leading biological disarmament and non-proliferation experts believe that the risk of a small-scale bioterrorism attack is very real and very present, they consider the risk of sophisticated large-scale bioterrorism attacks to be very small (65). This is backed up by historical evidence. The three confirmed attempts to use biological agents against humans in terrorist attacks in the past were small-scale, low casualty events aimed at causing panic, and disruption rather than excessive death tolls: (i) the Rajneesh cult’s use of Salmonella on salad bars in local restaurants to sicken potential voters and make them stay away from the polls during Oregon elections in 1984; (ii) the 1990–95 attempted use of botulinum toxin and anthrax by the Japanese Aum Shinrikyo cult; (iii) and the “anthrax letters” sent to media outlets and members of US Congress in 2001 resulting in at least 22 cases of anthrax, five of which were fatal (66, 67). The second dimension to Myth 5 is the implicit assumption that producing a pathogenic organism equates producing a weapon of mass destruction. It does not. Considerable knowledge and resources are necessary for the processes of scaling up, storage, and developing a suitable dissemination method. These processes present significant technical and logistical barriers. Drawing from her in-depth study of the Iraqi, Soviet, and US bioweapons programs (3, 4), Ben Ouagrham-Gormley explains: Scaling up fragile microorganisms that are sensitive to environmental conditions and susceptible to change — and viruses are more sensitive than bacteria — has been one of the stiffest challenges for past bioweapons programs to overcome, even with appropriate expertise at hand. Scaling-up requires a gradual approach, moving from laboratory sample, to a larger laboratory quantity, to pilot-scale production, and then to even larger-scale production. During each stage, the production parameters need to be tested and often modified to maintain the lethal qualities of the agent; the entire scaling-up process can take several years (68). The dissemination of biological agents also poses difficult technical challenges. Whereas persistent chemical agents such as sulfur mustard and VX nerve gas are readily absorbed through the intact skin, no bacteria and viruses can enter the body via that route unless the skin has already been broken. Biological agents must either be ingested or inhaled to cause infection. To expose large numbers of people through the gastrointestinal tract, possible means of delivery are contamination of food and drinking water, yet neither of these scenarios would be easy to accomplish. Large urban reservoirs are usually unguarded, but unless terrorists added massive quantities of biological agent, the dilution effect would be so great that no healthy person drinking the water would receive an infectious dose (66). Moreover, modern sanitary techniques such as chlorination and filtration are designed to kill pathogens from natural sources and would probably be equally effective against a deliberately released agent. Bacterial contamination of the food supply is also unlikely to inflict mass casualties. Cooking, boiling, pasteurization, and other routine safety precautions are generally sufficient to kill pathogenic bacteria. The most likely way to inflict mass casualties with a biological agent is by disseminating it as a respirable aerosol: an invisible cloud of infectious droplets or particles so tiny that they remain suspended in the air for long periods and can be inhaled by large numbers of people. A high-concentration aerosol of B. anthracis or some other pathogen, released into the air in a densely populated urban area, could potentially infect thousands of victims simultaneously. After an incubation period of a few days, depending on the type of agent and the inhaled dose, the exposed population would experience an outbreak of an incapacitating or fatal illness. Although aerosol delivery is potentially the most lethal way of delivering a biological attack, it involves major technical hurdles that most terrorists would be unlikely to overcome. To infect through the lungs, infectious particles must be microscopic in size – between 1 and 5 μm in diameter. Terrorists would therefore have to develop or acquire a sophisticated delivery system capable of generating an aerosol cloud with the necessary particle size range and a high enough agent concentration to cover a broad area. Overall, an important trade-off exists between ease of production and effectiveness of dissemination. The easiest way to produce microbial agents is in a liquid form, yet when such a “slurry” is sprayed into the air, it forms heavy droplets that fall to the ground so that only a small percentage of the agent is aerosolized. In contrast, if the bacteria are first dried to a solid cake and then milled into a fine powder, they become far easier to aerosolize, yet the drying and milling process is technically difficult. The Aum Shinrikyo cult struggled with dissemination (67, 69, 70). In one of its anthrax dissemination attempts, it sprayed unknown, but probably very large, quantities of a liquid aerosol (most likely crude culture, unprocessed in any way) of B. anthracis from the roof of the Aum’s headquarters building in Tokyo. For the dissemination, the Aum set up two sprayers on the roof of the eight-story building, each within a large round cooling tower. Pipes were extended from the cooling towers to tanks below, which were filled with a liquid suspension of B. anthracis. The device worked poorly, producing large droplets rather than the very fine aerosol needed for effective transmission of anthrax. It also appears the spore concentration was very low (at least five orders of magnitude below that necessary for a highly infectious wet aerosol). In another dissemination attempt, targeting the area around the Kanagawa prefectural office and the Imperial Palace, the Aum equipped vehicles with spraying devices, but according to prosecutors’ statements, the nozzle of the sprayer clogged and the operation failed. Despite its 200 m2 laboratory containing, amongst other equipment, a glove box, incubator, centrifuge, drier, DNA/RNA synthesizer, electron microscope, two fermenters each having about a 2,000 litre capacity, and an extensive scientific library, and despite its repeated attempts at dissemination, the Aum was unsuccessful in causing any disease, and in retrospect it is clear that the cult did not even make the first substantive step toward an effective bioweapon. If, despite the odds, aerosolization was achieved, the effective delivery of biological agents in the open air is highly dependent on atmospheric and wind conditions, creating additional uncertainties. Only under highly stable atmospheric conditions would the aerosol cloud remain close to the ground where it can be inhaled, rather than being rapidly dispersed. Moreover, most microorganisms are sensitive to ultraviolet radiation and cannot survive more than 30 min in bright sunlight, limiting their use to night-time attacks. One major exception is anthrax, which can be induced to form spores with tough outer coats that enable them to survive for several hours in sunlight. Terrorists could, of course, stage a biological attack inside an enclosed space such as a building, a subway station, a shopping mall, or a sports arena. Such an attack, if it involved a respiratory aerosol, might infect thousands of people, but even here the technical hurdles would by no means be trivial. Finally, even if a biological weapon had been disseminated successfully, the outcome of an attack would be affected by factors like the health of the people who are exposed to the agent, and the speed and manner with which public health authorities and medical professionals detected and were able to respond to the resulting outbreak. A prompt response with effective medical countermeasures, such as antibodies and vaccination, can significantly blunt the impact of an attack. Simple, proven ways to curtail epidemics, such as wearing face masks, hand washing, and avoiding hospitals where transmission rates might soar, can also prove effective in stemming the spread of a disease. Indeed, this aspect of a bioterrorism attack is often underplayed in scenarios like Tara O’Toole’s “Dark Winter” and “Atlantic Storm,” where the rates of contagion used are often significantly higher than those in historical cases of natural outbreaks (71).

### A2 Bioterror DA – Int'l Coop Turn

#### Government controls crush foreign cooperation

Knezo 6 (Genevieve J. Knezo – Specialist in Science and Technology Policy Resources, Science, and Industry Division + this is a CRS Report for Congress, pgs. 36 – 53, “Controls on Unclassified Biological Research Information”, “’Sensitive But Unclassified’ Information and Other Controls: Policy and Options for Scientific and Technical Information”, https://fas.org/sgp/crs/secrecy/RL33303.pdf)

Some say that placing controls on unclassified information could negatively affect governmental relations with the private sector and procurement for information technology and other contracts. New ideas for information security technologies, including hard technology, software and biotech-related products, often come from overseas, as do bids for contracts to handle sensitive agency information. Reportedly, foreign vendors will have trouble complying with contracts that need to meet information security standards. It has been reported that requests for proposals (RFPs) coming from the Defense Security Services involving data processing for its SBU information say that employees of potential vendors need to be U.S. citizens, with background checks. DHS and DOT procurement rules involving sensitive information specify background checks for prime or subcontractors and that nondisclosure forms have to be signed.226 There is also the view that scientists who voluntarily agree to pre-research and prepublication reviews of research articles could harm a university’s ability to conduct fundamental research involving foreigners as permitted by National Security Decision Directive-189 (NSDD-189) and related regulations. (For additional information, see a previous section of this report entitled “Summary of Federal Policies to Classify or Control Scientific and Technical Information.” According to Robert Hardy of the nonprofit Council on Governmental Relations ... by placing restrictions on publishing ... the [Department of Homeland Security-funded centers of excellence] could risk losing the privileges that universities enjoy because they do fundamental research — defined a work whose results are ‘published and shared broadly within the scientific community.’ One important privilege is being able to involve foreign nationals in any research project without obtaining a government license.227

#### Specifically, international science coop contains disease spread

Hiler 16 [Katie Hiler (assistant producer for Science Friday, a podcast for international issues in S&T), "Can International Diplomacy Help Combat the World’s Superbugs?" 9/16/2016] AZ

In a meeting of the UN General Assembly on Wednesday, world leaders committed to toughening regulation of antimicrobials and encouraging development of new antibiotics and treatments, among other measures. The agreement was an exceptional move for the group, which has only taken up three other health issues in the past — HIV, non-communicable diseases and Ebola. Antimicrobial resistance happens when bacteria, parasites, viruses and fungi adapt to drugs previously used to combat them — and globally, the problem is growing. In 2014, researchers in the UK estimated that 700,000 people worldwide die of drug-resistant infections each year, and that the death toll could climb to 10 million people annually by 2050 — claiming even more lives than cancer and diarrheal diseases do now. Of the many forms that antimicrobial resistance takes, health officials are particularly concerned about growing resistance to the antibiotics that treat everything from common STIs to urinary tract infections, pneumonia and tuberculosis. But even a freshly inked agreement at UN headquarters may not kill a question that many have been asking since the meeting was put on the books. Namely, how much can a political body like the UN — usually focused on economics and international security — do to halt superbugs? Laura Kahn, a physician and research scholar at Princeton University, says actually, international cooperation is our best shot at fighting antibiotic resistance. That’s because the causes of antibiotic resistance are rooted in issues like the global economy, food security and the environment. “For us, antibiotics are the foundation of modern medicine, but we can’t forget that agriculture, and the food security that it provides, is the foundation of civilization itself,” Kahn says. “And so for a lot of countries that don’t have food security, they still have many, many hungry people. And let’s not forget that the United States has some hungry people too. This is a really difficult balancing act — between figuring out whether or not we can feed ourselves sustainably and still have our antibiotics, too.” Kahn says along with the US, the world’s top total users of antibiotics are India and China. Of the approximately 1 billion people worldwide who lack access to public sanitation, 600 million live in India, where open defecation has led to high rates of diarrheal diseases, malnutrition and other ailments. As a result, antibiotics — available over the counter in India — are in frequent use, leading to what Kahn calls “some of the most resistant bacteria in the world.” And in China, where some of the world’s largest pig farms feed the world’s largest population, researchers have gotten a crash course in how our widespread use of antibiotics in animal husbandry is changing the environment. Kahn says one study found that antibiotic-resistant gene residues in the manure of large Chinese swine farms were up to 28,000 times greater than levels at farms that don’t use antibiotics. “And of course, all of this manure gets into the soil and the waterways and the coastal waters,” Kahn says. “Ultimately, we are altering the global resistome in ways that we don’t understand. Many of the antibiotics that we have come from soil bacteria, and so by placing all of this manure with increased levels of antibiotics and resistance genes [in the soil], resistant bacteria mixes in with the soil microbes. It’s not good.” Using metagenomics, scientists have extracted DNA directly from soil and discovered antibiotic resistance genes all over the world. “They’re in the Arctic permafrost, they’re in Antarctic lakes,” Kahn says. “They appear to be ancient and everywhere. And by blasting the environment with all of our antibiotic use, we are increasing the expression of these genes.” But if anything, Kahn says, the spread of antibiotic resistance in the environment underscores the need for a coordinated effort like the UN’s to address the issue — with solutions ranging from improving public sanitation to encouraging development of antibiotic alternatives. “It’s a major global problem, involving humans, animals, and the environment,” Kahn says. “I just want to put a plug in to the ‘one health’ concept, and this is the simple concept that human, animal, and environmental health are linked. And because they are linked, we must address complex issues such as antimicrobial resistance in an interdisciplinary way. That’s the only way we can do it.”

#### Science diplomacy solves a laundry list of impacts

Federoff 8 [Nina, Science and Technology Adviser to the Secretary of State, http://www.gpo.gov/fdsys/pkg/CHRG-110hhrg41470/html/CHRG-110hhrg41470.htm]

Chairman Baird, Ranking Member Ehlers, and distinguished members of the Subcommittee, thank you for this opportunity to discuss science diplomacy at the U.S. Department of State**.** The U.S. is recognized globally for its leadership in science and technology. Our scientific strength is both a tool of ``soft power''--part of our strategic diplomatic arsenal--and a basis for creating partnerships with countries as they move beyond basic economic and social development. Science diplomacy is a central element of the Secretary's transformational diplomacy initiative, because science and technology are essential to achieving stability and strengthening failed and fragile states. S&T advances have immediate and enormous influence on national and global economies, and thus on the international relations between societies. Nation states, nongovernmental organizations, and multinational corporations are largely shaped by their expertise in and access to intellectual and physical capital in science, technology, and engineering. Even as S&T advances of our modern era provide opportunities for economic prosperity, some also challenge the relative position of countries in the world order, and influence our social institutions and principles. America must remain at the forefront of this new world by maintaining its technological edge, and leading the way internationally through science diplomacy and engagement. The Public Diplomacy Role of Science Science by its nature facilitates diplomacy because it strengthens political relationships, embodies powerful ideals, and creates opportunities for all. The global scientific community embraces principles Americans cherish**:** transparency, meritocracy, accountability, the objective evaluation of evidence, and broad and frequently democraticparticipation**.** Science is inherently democratic, respecting evidence and truth above all. Science is also a common global language, able to bridge deep political and religious divides. Scientists share a common language. Scientific interactions serve to keep open lines of communication and cultural understanding. As scientists everywhere have a common evidentiary external reference system, members of ideologically divergent societies can use the common language of science to cooperatively address both domestic and the increasingly trans-national and global problems confronting humanity in the 21st century. There is a growing recognition that science and technology will increasingly drive **t**he successful economies of the 21st century. Science and technology provide an immeasurable benefit to the U.S. by bringing scientists and students here, especially from developing countries, where they see democracy in action, make friends in the international scientific community, become familiar with American technology, and contribute to the U.S. and global economy. For example, in 2005, over 50 percent of physical science and engineering graduate students and postdoctoral researchers trained in the U.S. have been foreign nationals. Moreover, many foreign-born scientists who were educated and have worked in the U.S. eventually progress in their careers to hold influential positions in ministries and institutions both in this country and in their home countries. They also contribute to U.S. scientific and technologic development: According to the National Science Board's 2008 Science and Engineering Indicators, 47 percent of full-time doctoral science and engineering faculty in U.S. research institutions were foreign-born. Finally, some types of science--particularly those that address the grand challenges in science and technology--are inherently international in scope and collaborative by necessity. The ITER Project, an international fusion research and development collaboration, is a product of the thaw in superpower relations between Soviet President Mikhail Gorbachev and U.S. President Ronald Reagan. This reactor will harness the power of nuclear fusion as a possible new and viable energy source by bringing a star to Earth. ITER serves as a symbol of international scientific cooperation among key scientific leaders in the developed and developing world--Japan, Korea, China, E.U., India, Russia, and United States--representing 70 percent of the world's current population. The recent elimination of funding for FY08 U.S. contributions to the ITER project comes at an inopportune time as the Agreement on the Establishment of the ITER International Fusion Energy Organization for the Joint Implementation of the ITER Project had entered into force only on October 2007. The elimination of the promised U.S. contribution drew our allies to question our commitment and credibility in international cooperative ventures. More problematically, it jeopardizes a platform for reaffirming U.S. relations with key states. It should be noted that even at the height of the cold war, the United States used science diplomacy as a means to maintain communications and avoid misunderstanding between the world's two nuclear powers--the Soviet Union and the United States. In a complex multi-polar world, relations are more challenging, the threats perhaps greater, and the need for engagement more paramount. Using Science Diplomacy to Achieve National Security Objectives The welfare and stability of countries and regions in many parts of the globe require a concerted effort by the developed world to address the causal factors that render countries fragile and cause states to fail. Countries that are unable to defend their people against starvation, or fail to provide economic opportunity, are susceptible to extremist ideologies, autocratic rule, and abuses of human rights. As well, the world faces common threats, among them climate change, energy and water shortages, public health emergencies, environmental degradation, poverty, food insecurity, and religious extremism. These threats can undermine the national security of the United States, both directly and indirectly. Many are blind to political boundaries, becoming regional or global threats. The United States has no monopoly on knowledge in a globalizing world and the scientific challenges facing humankind are enormous. Addressing thesecommonchallenges demands common solutions and necessitates scientific cooperation, common standards, and common goals. We must increasingly harness the power of American ingenuity in science and technology through strong partnerships with the science community in both academia and the private sector, in the U.S. and abroad among our allies, to advance U.S. interests in foreign policy.

### A2 Tech Leadership DA

#### Failed US policies will collapse high tech competitiveness and promote confrontation with China

Petras, PhD, 16 (James, 8/20/16, http://www.globalresearch.ca/chinas-pivot-to-world-markets-washingtons-pivot-to-world-wars/5541802)

China has moved from a country, highly dependent on foreign investment in consumer industries for exports, to an economy, based on joint public-private investments in higher value exports. China’s early growth was based on cheap labor, low taxes and few regulations on multi-national capital. Foreign capital and local billionaires stimulated growth, based on high rates of profit. As the economy grew, China’s economy shifted toward increasing its indigenous technological expertise and demanding greater ‘local content’ for manufactured goods. By the beginning of the new millennium China was developing high-end industries, based on local patents and engineering skills, channeling a high percentage of investments into civilian infrastructure, transportation and education. Massive apprenticeship programs created a skilled labor force that raised productive capacity. Massive enrollment in science, math, computer science and engineering universities provided a large influx of high-end innovators, many of whom had gained expertise in the advanced technology of overseas competitors. China’s strategy has been based on the practice of borrowing, learning, upgrading and competing with the most advanced economics of Europe and the US. By the end of the last decade of the 20th century, China was in a position to move overseas. The accumulation process provided China with the financial resources to capture dynamic overseas enterprises. China was no longer confined to investing in overseas minerals and agriculture in Third World countries. China is looking to conquer high-end technological sectors in advanced economics. By the second decade of the 21st century Chinese investors moved into Germany, Europe’s most advanced industrial giant. During the first 6 months of 2016 Chinese investors acquired 37 German companies, compared with 39 in all of 2015. China’s total investments in Germany for 2016 may double to over $22 billion dollars. In 2016, China successfully bought out KOKA, Germany’s most innovative engineering company. China’s strategy is to gain superiority in the digital future of industry. China is rapidly moving to automate its industries, with plans to double the robot density of the US by the year 2020. Chinese and Austrian scientists successfully launched the first quantum-enabled satellite communication system which is reportedly ‘hack proof’, ensuring China’s communications security. While China’s global investments proceed to dominate world markets, the US, England and Australia have been trying to impose investment barriers. By relying on phony ‘security threats’, Britain’s Prime Minister Theresa May blocked a multi-billion dollar Chinese investment-heavy nuclear plant (Hinckley Point C). The pretext was the spurious claim that China would use its stake to “engage in energy blackmail, threatening to turn off the power in the event of international crises”. The US Committee on Foreign Investment has blocked several multi-billion dollar Chinese investments in high tech industries. In August 2016 Australia blocked an $8 billion-dollar purchase of a controlling stake in its biggest electricity distribution network on specious claims of ‘national security’. The Anglo-American and German empires are on the defensive. They increasingly cannot compete economically with China, even in defending their own innovative industries. In large part this is the result of their failed policies. Western economic elite have increasingly relied on short-term speculation in finance, real estate and insurance, while neglecting their industrial base. Led by the US, their reliance on military conquests (militaristic empire-building) absorb public resources, while China has directed its domestic resources toward innovative and advanced technology. To counter China’s economic advance, the Obama regime has implemented a policy of building economic walls at home, trade restrictions abroad and military confrontation in the South China Seas – China’s strategic trade routes. US officials have ratcheted up their restrictions on Chinese investments in high tech US enterprises including a $3.8 billion investment in Western Digital and Philips attempt to sell its lighting business. The US blocked ‘Chen China’s planned $44 billion takeover of Swiss chemical group ‘Syngenta’. US officials are doing everything possible to stop innovative billion dollar deals that include China as a strategic partner. Accompanying its domestic wall, the US has been mobilizing an overseas blockade of China via its Trans-Pacific-Partnership, which proposes to exclude Beijing from participating in the ‘free trade zone’ with a dozen North America, Latin American and Asian members. Nevertheless, not a single member-nation of the TPP has cut back its trade with China. On the contrary, they are increasing ties with China – an eloquent comment on Obama’s skill at ‘pivoting’. While the ‘domestic economic wall’ has had some negative impacts on particular Chinese investors, Washington has failed to dent China’s exports to US markets. Washington’s failure to block China’s trade has been even more damaging to Washington’s effort to encircle China in Asia and Latin America, Oceana and Asia. Australia, New Zealand, Peru, Chile, Taiwan, Cambodia and South Korea depend on Chinese markets far more than on the US to survive and grow. While Germany, faced with China’s dynamic growth, has chosen to ‘partner’ and share, up-scale productive investments, Washington has opted to form military alliances to confront China. The US bellicose military alliance with Japan has not intimidated China. Rather it has downgraded their domestic economies and economic influence in Asia. Moreover, Washington’s “military pivot” has deepened and expanded China’s strategic links to Russia’s energy sources and military technology. While the US spends hundreds of billions in military alliances with the backward Baltic client-regimes and the parasitical Middle Eastern states, (Saudi Arabia, Israel), China accumulates strategic expertise from its economic ties with Germany, resources from Russia and market shares among Washington’s ‘partners’ in Asia and Latin America. There is no question that China, following the technological and productive path of Germany, will win out over the US’s economic isolationist and global militarist strategy.

### A2 Funding DA

#### No link – the military is time-pressed to produce semi-conductor and other crucial research. If all colleges refuse to participate, the government will be forced to remove limitations on projects – that's Winograd. Empirics prove – a petition against the Strategic Computing Initiative resulted in change

#### No link – Trump crushes federal funding

Treisman & Wang 16 [Rachel Treisman and Kevin Wang, "Faculty uneasy about federal funding under Trump," Yale Daily News, 11/18/2016] AZ

Yale faculty members have mixed feelings about federal research funding under Donald Trump’s presidency. Many say the prospects for funding look bleak, while others are hopeful that Trump will be a boon for medical research. While Trump has not explicitly said he will support or cut federal funding for academic research, Yale faculty from across many departments and professional schools are concerned about what a Trump presidency will mean for their fields based on his campaign’s rhetoric. Faculty are searching for a silver lining in an unpredictable and often contradictory president-elect, according to researchers and professors interviewed by the News. “Faculty raise concerns about what might happen, but people are continuing to do their work,” Gary Brudvig, director of the Yale Energy Sciences Institute and professor of chemistry said. Mark Hochstrasser, professor of molecular, cellular and developmental biology, said the Trump administration’s stance on science, particularly climate change, is discouraging. He added that his lab, like most academic labs in the biological sciences, receives research support from the federal government. Because federal science funding has seen a downward trend for the last 15 years, Hochstrasser said further cuts would be “devastating.” A CHANGING CLIMATE IN WASHINGTON Science research is often expensive because it requires state-of-the-art equipment and teams of graduate students, postdoctoral fellows and faculty, according to Yale’s Deputy Provost for Research and physics professor Steve Girvin. “Yale has a vast array of sponsored research projects with total external funding that exceeds $650 million a year,” Girvin said. “Most of this is federal funding, but private foundations and corporations also contribute importantly to the mix. Sponsored research projects span from clinical trials for new cancer therapies, to studies of earthquakes, cosmology, computer security, cognitive science and quantum information science.” Brudvig expressed uncertainty about what to expect from a Trump presidency, but added that he was concerned by Trump’s stated skepticism of climate change. Trump’s assertion that climate change is a Chinese-created hoax and his cabinet appointment of climate change deniers are causes for concern, Brudvig said. He added that he fears the Trump administration will “abandon climate agreements that have been made.” While expressing their concerns, faculty also discussed ways to make progress despite ongoing decreases in federal research funding. Chemistry professor Anna Marie Pyle said she is hopeful that the new U.S. Senate Democratic Minority Leader Chuck Schumer, a staunch supporter of research funding, will “interface effectively” with Republican Majority Leader Mitch McConnell, R-K.Y., and Trump

#### Federal funding declining anyway – university endowments and companies fill in

Mervis 17 [Jeffrey Mervis, "Data check: U.S. government share of basic research funding falls below 50%," Science, 3/9/2017] AZ

For the first time in the post–World War II era, the federal government no longer funds a majority of the basic research carried out in the United States. Data from ongoing surveys by the National Science Foundation (NSF) show that federal agencies provided only 44% of the $86 billion spent on basic research in 2015. The federal share, which topped 70% throughout the 1960s and ’70s, stood at 61% as recently as 2004 before falling below 50% in 2013. The sharp drop in recent years is the result of two contrasting trends—a flattening of federal spending on basic research over the past decade and a significant rise in corporate funding of fundamental science since 2012. The first is a familiar story to most academic scientists, who face stiffening competition for federal grants. But the second trend will probably surprise them. It certainly flies in the face of conventional wisdom, which paints U.S. companies as so focused on short-term profits that they have all but abandoned the pursuit of fundamental knowledge, an endeavor that may take decades to pay off. (This month, for example, Duke University’s Center for Innovation Policy will hold a conference entitled “The Decline in Corporate Research: Should We Worry?”) NSF defines basic research as “activity aimed at acquiring new knowledge or understanding without specific immediate commercial application or use.” In contrast, it says applied research is “aimed at solving a specific problem or meeting a specific commercial objective.” The U.S. pharmaceutical industry is the major driver behind the recent jump in corporate basic research, according to NSF’s annual Business Research and Development and Innovation Survey (BRDIS), which tracks the research activities of 46,000 companies. Drug company investment in basic research soared from $3 billion in 2008 to $8.1 billion in 2014, according to the most recent NSF data by business sector. Spending on basic research by all U.S. businesses nearly doubled over that same period, from $13.9 billion to $24.5 billion. Basic research comprises only about one-sixth of the country’s spending on all types of R&D, which totaled $499 billion in 2015. Applied makes up another one-sixth, whereas the majority, some $316 billion, is development. Almost all of that is funded by industry and done inhouse, as companies try to convert basic research into new drugs, products, and technologies that they hope will generate profits. (The pharmaceutical and biotech industry, for example, spent a total of $102 billion on research and development in 2015, according to Research!America, an Arlington, Virginia–based advocacy group.) Those private sector efforts are now the dominant form of research activity in the United States, with business spending $3 on research for every $1 invested by the U.S. government. In the 1960s the federal government outspent industry by a two-to-one margin, but the balance tipped in 1980. Although eye-opening, the NSF business data are not as definitive as agency officials might like. About 30% of the companies that receive the BRDIS don’t respond; in comparison, nearly every university fills out NSF’s survey on research in higher education. And even companies that do return the business survey often ignore the question asking them to divide the company’s overall research investment into basic and applied pots, notes John Jankowski, head of R&D statistics within NSF’s National Center for Science and Engineering Statistics in Arlington. The NSF data capture another notable trend: a slow but steady rise in spending on basic research by universities and private foundations. Their combined $22 billion investment in 2015 represents a 25% share of the U.S. total, up from 21% in 2010 and 17% in 1995.

#### No impact – the most important research projects will get federal grants anyway – the plan just pushes researchers away from easy money with strings attached

#### Case outweighs – even if, worst case scenario – half of currently funded researchers lose their funding, providing cutting-edge research for open access generates higher-quality research for the long-term

### A2 Donors DA – Top Level

#### No link – the aff is research not student speech

#### Restricting free speech on campuses causes slashes in federal funding – Trump proves

Redell 2/2 [Bob Redell, Lisa Fernandez, Rhea Mahbubani, Ian Cull, Raquel Dillon and Scott Budman, "President Donald Trump Takes on UC Berkeley on Twitter: Threatens Federal Funds," NBC Bay Area, 2/2/2017] AZ

The morning after violent protests at the University of California, Berkeley prompted the cancellation of a speech by a controversial Breitbart editor, the president of the United States took on the school — on Twitter. "If U.C. Berkeley does not allow free speech and practices violence on innocent people with a different point of view - NO FEDERAL FUNDS?" Trump tweeted at 12:13 a.m. ET on Thursday. Trump's tweet caused a firestorm frenzy, ranging from whether the university would actually lose millions of dollars, to the sanctity of the First Amendment. Many noted the irony of Berkeley, Calif. being the birthplace of the Free Speech movement in the 1960s. And yet, it was the progressive campus that was full of armed "Ninja-like agitators" who ended up wreaking havoc on the campus and canceling the speech that was to be made by controversial Breitbart editor Milo Yiannopoulos. Berkeley Mayor Jesse Arreguin lambasted those who tried to mar that tradition. "Using speech to silence and promote bigotry is unacceptable. Hate speech isn't welcome in our community," he tweeted. But, in a second tweet, he wrote: "Violence and destruction is not the answer." Cal student Juliana Mora agreed: "We don't stand for that. We don't want to get mixed up with the few bad apples. This is the home of free speech." The free speech movement was forged at UC Berkeley in the 1960s. Bettina Apthekar, among those in the thick of it, was targeted for organizing a peaceful protest against the Nazi party on campus. "Their signs said, ‘Burn Aptheker,’” she recalled. But Aptheker supported the opposing side’s First Amendment rights, and said the university did the right thing by not standing in the way of college Republicans who wanted to invite Yiannapoulos. “We have to hold on to” the principle behind the freedom of speech and expression, she said. “It's too much of a slippery slope once you say this person can't speak." A generation later, David Sabes was a UC Berkeley student faced with a similar dilemma. He said the university should be a venue for different perspectives and peaceful protests. A recording of Yiannopoulos’ speech might have been a more powerful vehicle for the polarizing figure’s critics, he said. “That moment could have been caught and those would have been the videos that would be viral right now, as opposed to the videos of innocent individuals being attacked,” Sabes mused. As for Trump's veiled threat, UC Berkeley relies heavily on federal funds. In 2015-2016, for example, the university received $370 million in federal funds for reseach grants alone, 55 percent of the overall research funding budget. And according to the National Center for Education Statistics, Cal receives another $76 million in student aid from the federal government ($38 million in Pell Grants and $38 million in federal student loans). California Lt. Gov. Gavin Newsom weighed in on the money issue. Just before 8 a.m. on Thursday, he tweeted: "As a UC Regent, I'm appalled at your willingness to deprive over 38,000 students access to an education because of the actions of a few."

#### Outweighs the 1NC link –

#### alumni donations often go to aspects of the college that aren't key to educational quality like new buildings or sports stadiums, but our evidence proves federal funding is key to the parts of the college that their impact talks about. Federal funding cuts crush innovation and research

Watanabe & Khan 2/3 – bracketed for ableist language [Teresa Watanabe, Amina Khan (reporters), "UC would lose $9 billion for research, healthcare, education if Trump cut federal funds," LA Times, 2/3/2017] AZ

New treatments for genetic diseases. Advances in solar-based sustainable energy. Financial aid for needy students and medical assistance for the elderly. All of that — and much more — is supported by the $9 billion in federal funds given annually to the University of California for research, education and healthcare. Those funds drew widespread public attention Thursday, when President Trump tweeted that UC Berkeley’s federal funds might be at risk after campus officials cancelled an appearance by conservative firebrand Milo Yiannopoulos to safeguard the public from violent protesters. “If U.C. Berkeley does not allow free speech and practices violence on innocent people with a different point of view — NO FEDERAL FUNDS?” Trump tweeted. Legal experts say presidents have no authority to cut off federal funds for alleged violations of the 1st Amendment. Even if they did, pulling funding from UC — the nation’s premier public research university system — would ~~cripple~~ [damage] myriad projects that richly benefit the nation, said Stuart Russell, a computer scientist at UC Berkeley and founding director of the Center for Human-Compatible AI. Paid Post WHAT'S THIS? “For Trump to threaten federal funding, which by the way benefits the country in terms of the scientific research the campus does that helps our defense and helps our industries … seems like the act of a dictator,” he said. According to UC data, the $9 billion in annual federal funding includes: $3 billion in research grants. Nearly four-fifths of the funds are awarded by the National Institutes of Health and the National Science Foundation. UC is the nation’s largest recipient of federal funding for research and related projects, with UC San Francisco, UC San Diego and UCLA receiving the largest grants. $3.5 billion to UC medical centers for Medicare and Medicaid patients. $1.6 billion in financial aid to UC students for federal Pell Grants, work-study awards, graduate fellowships and other grants and scholarships. $800 million to operate the federal Lawrence Berkeley National Laboratory.

#### Federal funding makes up a larger portion of public colleges' budgets. Public schools specifically don't get many donations

AF 12 [Alumni Factor (data mining source and news source on performance of universities across the US), "Alumni Giving," 2012 is the last date cited] AZ

Small schools with high academic standards and a close-knit community do a better job than larger schools in creating an environment where intellectual development can occur and deep friendships can develop – these two factors appear to have the strongest correlation to alumni giving. Graduates of large, publicly funded schools are less likely to donate, since they feel that government already supports their schools. Smaller, private schools more heavily rely upon the donations of alumni, and hence have become skilled at convincing alumni to support them.

#### Non-unique – donations low

Wang 16 [Amy Wang (reporter), "Why alumni donations to Yale and other US colleges are hitting a new low," Quartz Magazine, 2/24/2016] AZ

Some two decades years ago, when asked to give to their alma mater, an enthusiastic 50% of Yale graduates opened their wallets. Last year, roughly 33% did, despite steady increases in university solicitation. Alumni donations are now at their lowest levels in two decades, according to Yale’s Office of Institutional Research. Why? Administrators aren’t sure, but Yale’s president Peter Salovey blames “trends in society today that probably work against participation,” according to the Yale Daily News this week. The problem isn’t limited to Yale. For years, colleges and universities across the US have seen their alumni giving rates decline. One reason is that college graduates face a growing slew of philanthropic options: There are more charities, religious institutions, social groups, and Kickstarter campaigns than one can count, and it’s hard to choose where to put your (finite amount of) money. Schools, especially elite schools with big endowments, can seem less appealing than social justice nonprofits or tech innovations. There’s another possible explanation: College solicitation efforts may be getting totally outdated. A 2014 report from Dan Allenby, founder of the Annual Giving Network and an assistant vice president of annual giving at Boston University, notes that schools still use terminology like “giving back” when most young alums don’t actually feel indebted to their schools. Considering the record level of college debt in the country, “how can we expect alumni to ‘give back’ when they haven’t finished paying the original bill?” Allenby asks.

#### No decrease in alumni donations – prefer survey data over mere anecdotes

Woodhouse 15 [Kellie Woodhouse, "Appeasing the Ones Who Feed You," Slate Magazine, 12/10/2015] AZ

Strauss recalled an institution his firm worked with about a decade ago that was cracking down on its fraternities after a series of troubling incidents. Alumni were contacting administrators expressing frustration with the crackdown, and the university was worried giving would suffer because of alumni concerns. But a survey of 900 alumni found that less than 1 percent of respondents actually said they’d decrease their giving. “They were hearing from all the squeaky wheels,” recalls Strauss, who added that a relatively small proportion of alumni at any institution are substantial donors. It’s the big donors that universities should keep in touch with during times of turmoil on campus.

#### Turn – alumni donors are decreasing support because colleges fail to address censorship –only plan solves alumni backlash by endorsing free speech

Jeremy Willinger 16 [Adminstrator of Heterdox Academy, apolitically diverse group of social scientists, natural scientists, humanists, and other scholars who want to improve our academic disciplines and universities. We share a concern about a growing problem: the loss or lack of “viewpoint diversity.” When nearly everyone in a field shares the same political orientation, certain ideas become orthodoxy, dissent is discouraged, and errors can go unchallenged.], "Protests Rise and Donations Drop: Alumni reactions to campus trends," Heterodox Academy, 8-16-2016, http://heterodoxacademy.org/2016/08/16/protests-rise-and-donations-drop-alumni-reactions-to-campus-trends/, ghs//BZ

Heterodox Academy was founded at a time during which issues of free speech and censorship were playing out on college campuses nationwide. While we appreciated the issues being brought to the table, many of us also marveled at the hostile and exclusionary methods used to bring them into focus. As it turns out, so did many alumni who have since decreased their support to many universities where these protests and requests for censorship were taking place. In a recent New York Times article “College Students Protest, Alumni’s Fondness Fades and Checks Shrink,” Anemona Hartocollis writes about the backlash from alumni as “an unexpected aftershock of the campus disruptions of the last academic year.” More than just a reaction, this is a repudiation of the tactics used by students and of the capitulation by administrators. From the piece: Alumni from a range of generations say they are baffled by today’s college culture. Among their laments: Students are too wrapped up in racial and identity politics. They are allowed to take too many frivolous courses. They have repudiated the heroes and traditions of the past by judging them by today’s standards rather than in the context of their times. Fraternities are being unfairly maligned, and men are being demonized by sexual assault investigations. And university administrations have been too meek in addressing protesters whose messages have seemed to fly in the face of free speech. While the article focuses specifically on Amherst College, it also mentions Princeton, Yale, and Claremont McKenna— all schools that had protests that made the national news. How far has fundraising fallen? Hartocollis reports: Among about 35 small, selective liberal arts colleges belonging to the fund-raising organization Staff, or Sharing the Annual Fund Fundamentals, that recently reported their initial annual fund results for the 2016 fiscal year, 29 percent were behind 2015 in dollars, and 64 percent were behind in donors, according to a steering committee member, Scott Kleinheksel of Claremont McKenna College in California. Important to note are the limited avenues alumni have to truly make their voices heard. Letters to the editor of the alumni magazine and campus paper are but small opportunities in context of how much a monetary gift actually means to the school. Whether this is a temporary drop as a response to trending topics and issues or indicative of a larger, more permanent state of fundraising is yet to be seen. But as we get further away from the initial burst of protests last fall, other stakeholders are beginning to make their voices felt. Alumni in particular-whether they are now on the right or the left—generally endorse free speech and free inquiry quite strongly. They may play an increasingly strong role as we enter the second year of student protests.

### A2 Donors DA – Innovation Turn

#### Free speech on public colleges is a key internal link to scientific discovery --- campus speech restrictions allows for worse forms of coercion that skews data and a culture of open debate is key to advancement

Economist 16 (“Under Attack”, “The Inconvenient Truth”, http://www.economist.com/news/leaders/21699909-curbs-free-speech-are-growing-tighter-it-time-speak-out-under-attack, EmmieeM)

Intolerance among Western liberals also has wholly unintended consequences. Even despots know that locking up mouthy but non-violent dissidents is disreputable. Nearly all countries have laws that protect freedom of speech. So authoritarians are always looking out for respectable-sounding excuses to trample on it. National security is one. Russia recently sentenced Vadim Tyumentsev, a blogger, to five years in prison for promoting “extremism,” after he criticized Russian policy in Ukraine. “Hate speech” is another. China locks up campaigners for Tibetan independence for “inciting ethnic hatred”; Saudi Arabia flogs blasphemers; Indians can be jailed for up to three years for promoting disharmony “on grounds of religion, race. . .caste. . .or any other ground whatsoever”. The threat to free speech on Western campuses is very different from that faced by atheists in Afghanistan or democrats in China. But when progressive thinkers agree that offensive words should be censored, it helps authoritarian regimes to justify their own much harsher restrictions and intolerant religious groups their violence. When human-rights campaigners object to what is happening under oppressive regimes, despots can point out that liberal democracies such as France and Spain also criminalize those who “glorify” or “defend” terrorism, and that may Western countries make it a crime to insult a religion or to incite racial hatred. One strongman who has enjoyed tweaking the West for hypocrisy is Recep Tayyip Erdogan, president of Turkey. At home, he will tolerate no insults to his person, faith, or policies. Abroad, he demands the same courtesy – and in Germany he has found it. In March a German comedian recited a satirical poem about him “shagging goats and oppressing minorities” (only the more serious charge is true). Mr. Erdogan invoked an old, neglected German law against insulting foreign heads of state. Amazingly, Angela Merkel, the German chancellor, has let the prosecution proceed. Even more amazingly, nine other European countries still have similar laws, and 13 bar insults against their own head of state. Opinion polls reveal that in many countries support for free speech is lukewarm and conditional. If words are upsetting, people would rather the government or some other authority made the speaker shut up. A group of Islamic countries are lobbying to make insulting religion a crime under international law. They have every reason to expect that they will succeed. So it is worth spelling out why free expression is the bedrock of all liberties. Free speech is the best defense against bad government. Politicians who err (that is, all of them) should be subjected to unfettered criticism. Those who hear it may respond to it; those who silence it may never find out how their policies misfired. As Amartya Sen, a Nobel laureate, has pointed out, no democracy with a free press ever endured famine. In all areas of life, free debate sorts good ideas from bad ones. Science cannot develop unless old certainties are queried. Taboos are the enemy of understanding. When China’s government orders economists to offer optimistic forecasts, it guarantees that its own policymaking will be ill-informed. When American social-science faculties hire only left-wing professors, their research deserves to be taken less seriously. The law should recognize the right to free speech as nearly absolute. Exceptions should be rare. Child pornography should be banned, since its production involves harm to children. States need to keep some things secret: free speech does not mean the right to publish nuclear launch codes. But in most areas where campaigners are calling for enforced civility (or worse, deference) they should be resisted. Blasphemy laws are an anachronism. A religion should be open to debate. Laws against hate speech are unworkably subjective and widely abused. Banning words or arguments which one group finds offensive does not lead to social harmony. On the contrary, it gives everyone an incentive to take offence – a fact that opportunistic politicians with ethnic-based support are quick to exploit. Incitement to violence should be banned. However, it should be narrowly defined as instances when the speaker intends to goad those who agrees with him to commit violence, and when his words are likely to have an immediate effect. Shouting “Let’s kill the Jews” to an angry mob outside a synagogue qualifies. Drunkenly posting “I wish all the Jews were dead” on an obscure Facebook page probably does not. Saying something offensive about a group whose members then start a riot certainly does not count. They should have responded with words, or by ignoring the fool who insulted them. In volatile countries, such as Rwanda and Burundi, words that incite violence will differ from those that would do so in a stable democracy. But the principles remain the same. The police should deal with serious and imminent threats, not arrest every bigot with a laptop or a megaphone. (The governments of Rwanda and Burundi, alas, show no such restraint.) Areopagitica online. Facebook, Twitter and other digital giants should, as private organizations, be free to deicide what they allow to be published on their platforms. By the same logic, a private university should be free, as far as the law is concerned, to enforce a speech code on its students. If you don’t like a Christian college’s rules against swearing, pornography and expressing disbelief in God, you can go somewhere else. However, any public college, and any college that aspires to help students grow intellectually, should aim to expose them to challenging ideas. The world outside campus will often offend them; they must learn to fight back using peaceful protests, rhetoric and reason. These are good rules for everyone. Never try to silence views with which you disagree. Answer objectionable speech with more speech. Win the argument without resorting to force. And grow a tougher hide.

### A2 Donors DA – Hartocollis

#### [A2 HARTOCOLLIS] Disproves uniqueness – the evidence cites a spike in protests in 2016 which kills alumni donations

### A2 Donors DA – Onink

#### [A2 ONINK] Answers their link arguments – it says colleges have high endowments since they've diversified their investments in equity and real estate – if that's true, alumni donations aren't key

### A2 Donors DA – 2AR Trump Turn

#### It's feasible – here's a solvency advocate

Rappaport 1/31 [Mike Rappaport (Darling Foundation Professor of Law at the University of San Diego, where he also serves as the Director of the Center for the Study of Constitutional Originalism. Professor Rappaport is the author of numerous law review articles in journals such as the Yale Law Journal, the Virginia Law Review, the Georgetown Law Review, and the University of Pennsylvania Law Review. His book, Originalism and the Good Constitution, which is co-authored with John McGinnis, was published by the Harvard University Press in 2013. Professor Rappaport is a graduate of the Yale Law School, where he received a JD and a DCL), "Protecting Freedom of Speech on College Campuses," Library of Law and Liberty, 1/31/2017] AZ

In a recent post, I discussed the use of left wing institutions by the right. Here I want to discuss a specific idea for promoting a so called right wing idea – protection of free speech on college campuses from violence and other disruption – by using the methods that the left has employed in the past. A common problem on both public and private campuses is that violent and disruptive protesters prevent right wing (and other controversial) speakers from giving speeches and presentations on campuses. In addition to preventing the events from being conducted in an orderly fashion, the threat of these protests sometimes causes schools either to cancel invitations or to refuse to allow invitations in the first place. It is also a common perception, especially of those on the right, that school administrations are not sympathetic to these right wing groups and therefore do not punish or otherwise hold accountable the students who are responsible for these threats and disruptions. How could Congress address this issue? It is not hard to come up with a way – one that is modelled on the institutional mechanisms used by the Department of Education to enforce its understanding of Title IX. Congress could pass legislation supported by the following findings: Free speech on college campuses has been undermined through violence, threats of violence, and the shouting down of speakers. Such actions are inconsistent with the idea of a university and are often illegal under state law, but the universities have failed to sufficiently prosecute such actions or protect speakers. Thus, it is necessary for the government to step in to protect such speech. Congress could provide that any university receiving funds from the government has an obligation to protect freedom of speech on its campus. Schools that receive federal funds have an obligation to have rules against infringements of freedom of speech through violence, threats of violence, and refusals to follow rules that allow speakers uninterrupted time to present their views. Such schools shall undertake to enforce these rules in a diligent manner. At a minimum, schools must take significant efforts to apprehend students who violate these rules, and must at the least record the names of the violators on their records. Schools shall be obligated to suspend for at least one year students who have been determined to have violated the rules more than once. Congress could also require that schools provide annual reports to the Department of Education providing information about the actions undertaken by the school, which events were improperly disrupted, which students were found to have violated the rules, and what penalties were imposed. The Department could also be required to receive complaints from speakers whose presentations were disrupted. Finally, and most importantly, Congress could require that the Department of Education take actions to deny federal funds to schools that violate these rules. These rules would put enormous pressure on schools to start protecting freedom of speech on their campuses. It would no doubt lead to significant resistance from schools, but the threat of a loss of government funds is significant. I should say that I do not necessarily favor such an arrangement. I don’t like a heavy handed federal government micromanaging institutions. But that is what we have already, except it is generally controlled by the left. If that is how our country is going to run, it is worth letting the other side know what its like to be on the receiving end of such heavy handedness.

### A2 Hate Speech DA

#### No link – the plan doesn't overturn speech codes or anti-harassment laws – it only removes free speech zones that restrict student speech to a few areas. That means the aff doesn't increase hate speech since existing regulation of speech would remain in place.

#### I control uniqueness – hate speech and crimes are increasing

Katie Reilly 16, "Racist Incidents Are Up Since Trump's Election. These Are Just a Few of Them," TIME, 11-13-2016, http://time.com/4569129/racist-anti-semitic-incidents-donald-trump/, ghs//BZ

The Southern Poverty Law Center received 200 hate crime reports since Election Day In the days since the presidential election, states across the country have seen increased incidents of racist or anti-Semitic vandalism and violence, many of which have drawn directly on the rhetoric and proposals of President-elect Donald Trump. The Southern Poverty Law Center has counted more than 200 complaints of hate crimes since Election Day, according to USA Today. “Since the election, we’ve seen a big uptick in incidents of vandalism, threats, intimidation spurred by the rhetoric surrounding Mr. Trump’s election,” Richard Cohen, president of the Southern Poverty Law Center told USA Today. “The white supremacists out there are celebrating his victory and many are feeling their oats.”

#### Link turn – the aff promotes protests on campus that change unjust hiring standards or discriminatory policies – for instance, protests may remove racist policies

#### Hate speech restrictions created by those in positions of power are more likely to hurt than help the oppressed.

Glasser 16 Ira Glasser (Former executive director of the American Civil Liberties Union, now president of the board of directors of the Drug Policy Alliance), quoted in “HATE SPEECH IS FREE SPEECH” by Jonothan Haidt, Spiked, 6/12/16, http://www.spiked-online.com/newsite/article/hate-speech-is-free-speech/18444#.WE5XNM6gTds //[LADI](http://www.theladi.org/evidence)

How is ‘hate speech’ defined, and who decides which speech comes within the definition? Mostly, it’s not us. In the 1990s in America, black students favoured ‘hate speech’ bans because they thought it would ban racists from speaking on campuses. But the deciders were white. If the codes the black students wanted had been in force in the 1960s, their most frequent victim would have been Malcolm X. In England, Jewish students supported a ban on racist speech. Later, Zionist speakers were banned on the grounds that Zionism is a form of racism. Speech bans are like poison gas: seems like a good idea when you have your target in sight — but the wind shifts, and blows it back on us.

### A2 Heg DA – Top Level

#### No link – their uniqueness evidence proves that college suppress anti-war activism through means *other* than free speech zones – no increase in anti-war protests

#### No link – they have no ev that anti-war protests would return – Levy is about 70s activism

#### No impact to military hegemony – no correlation between US activism and stability

Fettweis 11 Christopher J. Fettweis, Department of Political Science, Tulane University, 9/26/11, Free Riding or Restraint? Examining European Grand Strategy, Comparative Strategy, 30:316–332, EBSCO

It is perhaps worth noting that there is no evidence to support a direct relationship between the relative level of U.S. activism and international stability. In fact, the limited data we do have suggest the opposite may be true. During the 1990s, the United States cut back on its defense spending fairly substantially. By 1998, the United States was spending $100 billion less on defense in real terms than it had in 1990.51 To internationalists, defense hawks and believers in hegemonic stability, this irresponsible “peace dividend” endangered both national and global security. “No serious analyst of American military capabilities,” argued Kristol and Kagan, “doubts that the defense budget has been cut much too far to meet America’s responsibilities to itself and to world peace.”52 On the other hand, if the pacific trends were not based upon U.S. hegemony but a strengthening norm against interstate war, one would not have expected an increase in global instability and violence. The verdict from the past two decades is fairly plain: The world grew more peaceful while the United States cut its forces. No state seemed to believe that its security was endangered by a less-capable United States military, or at least none took any action that would suggest such a belief. No militaries were enhanced to address power vacuums, no security dilemmas drove insecurity or arms races, and no regional balancing occurred once the stabilizing presence of the U.S. military was diminished. The rest of the world acted as if the threat of international war was not a pressing concern, despite the reduction in U.S. capabilities. Most of all, the United States and its allies were no less safe. The incidence and magnitude of global conflict declined while the United States cut its military spending under President Clinton, and kept declining as the Bush Administration ramped the spending back up. No complex statistical analysis should be necessary to reach the conclusion that the two are unrelated. Military spending figures by themselves are insufficient to disprove a connection between overall U.S. actions and international stability. Once again, one could presumably argue that spending is not the only or even the best indication of hegemony, and that it is instead U.S. foreign political and security commitments that maintain stability. Since neither was significantly altered during this period, instability should not have been expected. Alternately, advocates of hegemonic stability could believe that relative rather than absolute spending is decisive in bringing peace. Although the United States cut back on its spending during the 1990s, its relative advantage never wavered. However, even if it is true that either U.S. commitments or relative spending account for global pacific trends, then at the very least stability can evidently be maintained at drastically lower levels of both. In other words, even if one can be allowed to argue in the alternative for a moment and suppose that there is in fact a level of engagement below which the United States cannot drop without increasing international disorder, a rational grand strategist would still recommend cutting back on engagement and spending until that level is determined. Grand strategic decisions are never final; continual adjustments can and must be made as time goes on. Basic logic suggests that the United States ought to spend the minimum amount of its blood and treasure while seeking the maximum return on its investment. And if the current era of stability is as stable as many believe it to be, no increase in conflict would ever occur irrespective of U.S. spending, which would save untold trillions for an increasingly debt-ridden nation. It is also perhaps worth noting that if opposite trends had unfolded, if other states had reacted to news of cuts in U.S. defense spending with more aggressive or insecure behavior, then internationalists would surely argue that their expectations had been fulfilled. If increases in conflict would have been interpreted as proof of the wisdom of internationalist strategies, then logical consistency demands that the lack thereof should at least pose a problem. As it stands, the only evidence we have regarding the likely systemic reaction to a more restrained United States suggests that the current peaceful trends are unrelated to U.S. military spending. Evidently the rest of the world can operate quite effectively without the presence of a global policeman. Those who think otherwise base their view on faith alone.

#### International restraints preserve American power – this preserves the liberal order while avoiding imperial violence and overreach

Sapolsky et al. ‘9 [Harvey M. Sapolsky is a professor of public policy and organization at MIT. Benjamin H. Friedman is a research fellow in defense and homeland security studies at Cato Institute. Eugene Gholz is an associate professor of public affairs at the University of Texas at Austin. Daryl G. Press is an associate professor of government at Dartmouth College. “Restraining Order: For Strategic Modesty” Fall, http://www.worldaffairsjournal.org/articles/2009-Fall/full-Sapolsky-etal-Fall-2009.html]

**Restraint would offer the opportunity to reinvigorate the foundations of America’s strength. Foreign distractions**, among other causes, **have led the U**nited **S**tates **to neglect its transportation infrastructure**, its **educational system**, its **finances**, **and** its **tech**nology **base**. **If we were to restrain** the **global interventionism** that has become our second nature since the end of World War II, **we could ensure our safety while** preserving our power **to deal** more precisely **with threats that may materialize in an uncertain future.** The first virtue of **a restraint strategy** is that it **husbands American power**. **It acknowledges** both **America’s great strengths—a combination of human and physical resources unmatched in the world—and the limitations of our power,** which is easily dissipated in wasteful attempts to manage global security. **No nation or ideology now menaces American security in the same ways or to the same degree that the Soviet Union** and Communism **did** **during the Cold War**. Instead, **a variety of ethnic, religious, and nationalistic conflicts** oceans away from us **now obsess our policymakers, even though those conflicts have** little to no prospect **of spreading our way**. To be sure, **radical Islamists** have attacked Americans at home and abroad, and while these attackers should be hunted down, they do not pose an existential threat, only a difficult and distracting one. Killing or capturing the criminals who attack Americans makes sense; **trying to fix** the **failed states** they call home **is** hopeless and unnecessary**. The U**nited **S**tates **is safer than ever. The challenge now is staying safe**. The U.S. military is supposed to stand between America and hostile nations, but its **forward deployment** actually **puts our forces between others and their own enemies**. **Alliances** once meant to hold a coalition together against a common foe **now protect foreign nations from adversaries that in most cases have no direct dispute with the U**nited **S**tates. **Although our allies are capable of fending for themselves, the fact that they can take shelter under an American umbrella allows them to defer taking responsibility for their own security**. The United States should now use tough love to get our allies off our security dole. We need to do less so others will do more. Restraint should not be confused with pacifism. Calling for America to come home is different today than it was during the Cold War, when there was a world to lose. Today it is not a call for capitulation or disarmament, though it does provide an opportunity for force reductions. The restraint strategy requires a powerful, full-spectrum, and deployable military that invests heavily in technology and uses realistic training to improve capabilities and deter challenges. Restraint demands a military with a global reach that is sparingly used. Similarly, restraint is not isolationism. **Isolation avoids economic and diplomatic engagement and eschews potential profits from the global economy and the enrichment that sharing ideas and cultures can offer**. The United States would be foolish to decline these opportunities. **Restraint does not mean retreating from history, but merely ending U.S. efforts to try to manage it. Restraint would rebalance global responsibilities among America and its allies, match our foreign objectives to our abilities, and put domestic needs first**.

### A2 Heg DA – Readiness Impact

#### Readiness low

Scarborough 16 [Rowan Scarborough (reporter) "U.S. military’s ability to fight major overseas war in doubt," Washington Times, 3/27/2016] AZ

Beneath the positive press the military receives for preparing to mold women into the nation’s first female ground warriors this year, there is another story far more basic to war fighting. Some lawmakers are warning that budget cuts, a troop drawdown and a decade and a half of wars have created spotty combat readiness, overburdened forces, more fatal accidents and beat-up weapons. Weeks of congressional testimony from the top brass on next year’s $524 billion defense budget shows that many Army brigades and Air Force squadrons are less ready. The Marine Corps lacks sufficient aircraft to fully train pilots. The Army and Marine Corps can wage small wars but doubt they can meet the demands of a major conflict against, say, China or Russia, in a time frame called for in official military strategy. After this sober news, the House Armed Services Committee sounded the alarm: “Concerns are growing louder and more frequent about the real-life consequences of cuts to personnel, training, equipment and other military resources as the security situation around the world becomes more precarious by the day.” Rep. Mac Thornberry, Texas Republican and committee chairman, issued scary statistics. The Marine Corps’ major, or “Class A,” accident rate has shot up from an average of 2.15 per 100,000 flying hours to 3.96. “We track this very closely, and the simple fact is that we don’t have enough airplanes to meet the training requirements for the entire force,” said Gen. Robert Neller, Marine commandant. “The force that’s deployed is trained “Our ability to meet other regional requirements for major contingency plans, we would build to do that, but we would probably not be able to do it within the time frame that the current plans call for us to arrive to participate in that conflict,” Gen. Neller said. Gen. Mark Milley, Army chief of staff, said rotary pilots need a minimum of 14 flying hours a month to stay sharp but are getting only 10 hours. Meanwhile, the Army’s major accident rates are increasing. “It does have our concern,” he testified. “Our aircraft accidents have increased, and we’re very concerned about it.” Gen. Milley said the force, cut from more than 490,000 to a planned 450,000, is sufficient for counterterrorism missions in Afghanistan and Iraq. But the overriding strategy of being able to fight a major overseas war is in doubt. “If that were to happen, then I have great concerns in terms of readiness of our force, the Army forces to be able to deal with that in a timely manner,” he said. “I think the cost, both in terms of time, casualties and troops, and the ability to accomplish military objectives would be very significant.” The reason: The overall status of Army Combat Brigade teams to mobilize and deploy has dropped. The Army supplies about 70 percent of troops and equipment requested by combatant commanders and has suffered nearly 70 percent of all war casualties since the Sept. 11, 2001, attacks. “So you’ve got the largest force, the largest demand, the largest stress and the least budget,” he said. Senate Armed Services Committee Chairman John McCain, Arizona Republican, has taken to issuing a readiness report at each service’s budget hearing. He said the Navy’s fleet of 272 ships “is too small to address critical security challenges” and that Navy aircraft carriers, the United States’ show of force around the world, are no longer constantly in the Persian Gulf region because of needed maintenance. “The Marines have a requirement for 38 amphibious ships, but they only have 30 in the fleet,” he said. “And Marine Corps aviation is in crisis. Pilots are not flying. “Each of our military services remains undersized, unready and underfunded to meet current and future threats,” he said. Why the crunch? The overriding factor is the 2011 Budget Control Act that mandated across-the-board cuts and then limited agency spending. Last year’s bipartisan budget agreement provided some relief to the Pentagon — $25 billion. But a congressional aide says it is still $17 billion short for fiscal 2017, which begins Oct. 1. Mr. McCain criticizes President Obama, saying that as commander in chief he should recognize the readiness crisis and ask Congress for more spending. “Instead, the president chose to request the lowest level of defense spending authorized by last year’s budget agreement and submitted a defense budget that is actually less in real dollars than last year, despite the fact that operational requirements had grown,” the senator said.

### A2 Title IX DA

#### No link – the aff doesn't overturn existing speech codes or sexual harassment policies

#### Restricting free speech on campuses causes slashes in federal funding – Trump proves

Redell 2/2 [Bob Redell, Lisa Fernandez, Rhea Mahbubani, Ian Cull, Raquel Dillon and Scott Budman, "President Donald Trump Takes on UC Berkeley on Twitter: Threatens Federal Funds," NBC Bay Area, 2/2/2017] AZ

The morning after violent protests at the University of California, Berkeley prompted the cancellation of a speech by a controversial Breitbart editor, the president of the United States took on the school — on Twitter. "If U.C. Berkeley does not allow free speech and practices violence on innocent people with a different point of view - NO FEDERAL FUNDS?" Trump tweeted at 12:13 a.m. ET on Thursday. Trump's tweet caused a firestorm frenzy, ranging from whether the university would actually lose millions of dollars, to the sanctity of the First Amendment. Many noted the irony of Berkeley, Calif. being the birthplace of the Free Speech movement in the 1960s. And yet, it was the progressive campus that was full of armed "Ninja-like agitators" who ended up wreaking havoc on the campus and canceling the speech that was to be made by controversial Breitbart editor Milo Yiannopoulos. Berkeley Mayor Jesse Arreguin lambasted those who tried to mar that tradition. "Using speech to silence and promote bigotry is unacceptable. Hate speech isn't welcome in our community," he tweeted. But, in a second tweet, he wrote: "Violence and destruction is not the answer." Cal student Juliana Mora agreed: "We don't stand for that. We don't want to get mixed up with the few bad apples. This is the home of free speech." The free speech movement was forged at UC Berkeley in the 1960s. Bettina Apthekar, among those in the thick of it, was targeted for organizing a peaceful protest against the Nazi party on campus. "Their signs said, ‘Burn Aptheker,’” she recalled. But Aptheker supported the opposing side’s First Amendment rights, and said the university did the right thing by not standing in the way of college Republicans who wanted to invite Yiannapoulos. “We have to hold on to” the principle behind the freedom of speech and expression, she said. “It's too much of a slippery slope once you say this person can't speak." A generation later, David Sabes was a UC Berkeley student faced with a similar dilemma. He said the university should be a venue for different perspectives and peaceful protests. A recording of Yiannopoulos’ speech might have been a more powerful vehicle for the polarizing figure’s critics, he said. “That moment could have been caught and those would have been the videos that would be viral right now, as opposed to the videos of innocent individuals being attacked,” Sabes mused. As for Trump's veiled threat, UC Berkeley relies heavily on federal funds. In 2015-2016, for example, the university received $370 million in federal funds for reseach grants alone, 55 percent of the overall research funding budget. And according to the National Center for Education Statistics, Cal receives another $76 million in student aid from the federal government ($38 million in Pell Grants and $38 million in federal student loans). California Lt. Gov. Gavin Newsom weighed in on the money issue. Just before 8 a.m. on Thursday, he tweeted: "As a UC Regent, I'm appalled at your willingness to deprive over 38,000 students access to an education because of the actions of a few."

#### Funding has never been withdrawn due to Title IX – no risk of a link

Kingkade 14 [Tyler Kingkade (senior reporter), "Colleges Warned They Will Lose Federal Funding For Botching Campus Rape Cases," Huffington Post, 7/14/2014] AZ

Lhamon was speaking at a summit on sexual assault hosted at Dartmouth College, one of the 67 colleges and universities currently under investigation by Lhamon’s agency over concerns that they did not properly handle sexual violence cases. Colleges are required under the gender equity law Title IX to address sexual assault and harassment on campus. The ultimate punishment for a school violating Title IX is a complete loss of federal funding. No disciplinary procedure has ever gone that far, but Lhamon emphasized that the option is always on the table.

#### Non-unique – schools violate Title IX now and enforcement is spotty at best

New 16 [Jake New (Reporter, covers student life and athletics for Inside Higher Ed), "Colleges say the Department of Education's guidance on campus sexual assault is vague and inconsistent," Inside Higher Ed, 2/25/2016] AZ

The Office for Civil Rights has repeatedly found institutions in violation of Title IX for, among other lapses, not expressly stating in their sexual harassment policies that mediation must not be used to resolve complaints of sexual assault. In recent years, the department has found that institutions such as Harvard University, Michigan State University, Tufts University and the State University of New York did not “provide for a prompt and equitable resolution of complaints of sex discrimination, as required by Title IX” by not including in their sexual misconduct policies a statement saying “that mediation of sexual assault complaints is prohibited.” All four institutions were required by the department to include such a statement in their updated policies as part of settlement agreements. The 2011 Dear Colleague letter, however, describes including this statement as a recommendation, not a clear mandate. “In cases involving allegations of sexual assault, mediation is not appropriate even on a voluntary basis,” the guidance states. “OCR recommends that recipients clarify in their grievance procedures that mediation will not be used to resolve sexual assault complaints.” Hartle, of ACE, said these cases point to a contradiction in how the guidance is described and enforced. “I think the challenge that colleges and universities have is the Department of Education is saying a large number of very different things about the guidance and what it means,” he said. “If you’re an institution, you’re not entirely sure what the department’s thinking actually is.”

### A2 Alt-Right DA

#### No link – the aff doesn't reduce restrictions on free speech since the plan only mandates that colleges can't restrict speech to certain zones so

#### Trump disproves uniqueness – the alt-right is already high now – there's only a risk that we reduce it, so the case turns the DA faster

### A2 Revenge Porn DA

#### Their link evidence is vague and uncertain – courts don't know if revenge porn is protected speech

#### No solvency – the CP can't be enforced since colleges don't have jurisdiction over off-campus speech

#### Revenge porn isn't constitutional protected speech

Citron 14 [Danielle Citron (law professor teaching at the University of Maryland Carey School of Law), "Debunking the First Amendment Myths Surrounding Revenge Porn Laws," Forbes Magazine, 4/18/2014] AZ

Disclosing private communications about purely private matters is just the sort of speech referred to in Stevens that has enjoyed less rigorous protection as a historical matter. We do not need a new category of unprotected speech to square anti-revenge porn criminal laws with the First Amendment. Now for the cases establishing that precedent. Smith v. Daily Mail, decided in 1979, addressed the constitutionality of a newspaper’s criminal conviction for publishing the name of a juvenile accused of murder. The Court laid down the now well-established rule that “if a newspaper lawfully obtains truthful information about a matter of public significance then state officials may not constitutionally punish the publication of the information, absent a need to further a state interest of the highest order.” Ever since the Court has refused to adopt a bright-line rule precluding civil or criminal liability for truthful publications “invading ‘an area of privacy’ defined by the State.” Rather the Court has issued narrow decisions that specifically acknowledge that press freedom and privacy rights are both “plainly rooted in the traditions and significant concerns of the society.’”

#### Nonconsensual sex videos aren't free speech – courts agree

Citron 14 [Danielle Citron (law professor teaching at the University of Maryland Carey School of Law), "Debunking the First Amendment Myths Surrounding Revenge Porn Laws," Forbes Magazine, 4/18/2014] AZ

Along similar lines, lower courts have upheld claims for public disclosure of private fact in cases involving the nonconsensual publication of sex videos. In Michaels v. Internet Entertainment Group, Inc., an adult entertainment company obtained a copy of a sex video made by a celebrity couple, Bret Michaels and Pamela Anderson Lee. The court enjoined the publication of the sex tape because the public had no legitimate interest in graphic depictions of the “most intimate aspects of” a celebrity couple’s relationship. As the court explained, a video recording of two individuals engaged in sexual relations “represents the deepest possible intrusion into private affairs.” These decisions support the constitutionality of efforts to criminalize revenge porn. Nude photos and sex tapes are among the most private and intimate facts; the public has no legitimate interest in seeing someone’s nude images without that person’s consent. A prurient interest in viewing someone’s private sexual activity does not change the nature of the public’s interest. On the other hand, the nonconsensual disclosure of a person’s nude images would assuredly chill private expression. Without any expectation of privacy, victims would not share their naked images. With an expectation of privacy, victims would be more inclined to engage in communications of a sexual nature. Such sharing may enhance intimacy among couples and the willingness to be forthright in other aspects of relationships. The fear of public disclosure of private intimate communications would have a “chilling effect on private speech.”

#### Revenge porn isn't protected

Harrison 14 [Anne Harrison, "Revenge Porn: Protected by the Constitution?" The Journal of Gender, Race & Justice, Volume 18, 2014] AZ

Because the anti-revenge-porn criminal statutes at issue are content-based speech restrictions, the State has the burden of showing they meet strict scrutiny. While content-based speech restrictions are presumptively invalid, legal scholars argue that the Supreme Court has held “where matters of purely private significance are at issue, First Amendment protections are less rigorous.” One scholar on the subject posited that such laws are likely to be upheld because the specific nude pictures involved “have nothing to do with public commentary about society.” There is some support for the notion that the laws will be upheld as cyber-stalking laws have not been found to violate the First Amendment.

### A2 GMOs DA

#### Students are neutral on GMOs – no link

Folkerth 15 [Connor Folkerth, "Students’ Knowledge and Opinions Concerning Genetically Modified Organisms: A Survey at University of Colorado Boulder," 2015] AZ

Despite the high amount of concern many of the respondents appeared to exhibit, the most selected attitude toward the production and selling of GMOs in stores was Neutral at 32%. There was then a close tie between respondents Agreeing and Disagreeing at 21% and 22% respectively. The major that had the strongest Disagreeing opinion were the Anthropology majors with half of the participants being against GMOs. The major that had the strongest Agreeing opinion toward GMOs was Biochemistry with 83% of the students agreeing, with Chemistry in second with 70% of their students agreeing. The respondents seem to agree that there are concerns regarding the use and consumption of GMOs, but they also believe there are benefits that can come from GMOs. There are 83% of students that believe GMOs can help produce higher crop yield, 70% that believe there are lower costs by using less pesticides and herbicides, and 59% believe GMOs will help with weather intolerance.

### A2 Cyberbullying DA

#### No link – the aff doesn't increase cyber-bullying since it doesn't remove restrictions on online bullying. The plan only prevents colleges from forcing students to protest or speak out within a particular zone – has nothing to do with online speech.

#### Federal law requires investigation and prosecution of cyberbullying

Stone 13 [Carolyn Stone (pHD in education), "Cyber Bullying: Disruptive Conduct or Free Speech?" 5/1/2013] AZ

The substantial disruption test will continue to burden school officials who have the responsibility of evaluating the level of disruption occurring or that might occur on campus as a result of off-campus online speech. School district officials are obligated under federal law to seek to remedy bullying and harassment that is severe, pervasive and objectively offensive. These statutes do not distinguish between whether bullying happened on or off campus.

#### State laws encompass anti-cyberbullying laws

Donegan 12 [Richard Donegan (Elon University), "Bullying and Cyberbullying:

History, Statistics, Law, Prevention and Analysis," The Elon Journal of Undergraduate Research in Communications, Vol. 3, No. 1, Spring 2012] AZ

Similar to speech and harassment laws at the federal level, individual states continue to wrestle with defining the problem and what legal actions to take when a violation occurs. Unfortunately, it took a number of high-profile cases, and even some suicides, to bring the issue to the attention of many states’ courts and legislatures. One such case revolved around an incident in Missouri during 2006. This case, formally known as United States vs. Lori Drew, involved Drew and her daughter creating a false MySpace account under the alias name “Josh.” The defendants used the account to become friends with the victim, 13-year-old Megan Meier, whom Drew’s daughter attended school with. After becoming friends with Meier, Drew and her daughter started sending hateful comments to her. Meier took these comments to heart and committed suicide. The Missouri district court determined that they could not hold Drew directly accountable for the harassment leading to Meier’s death due to extraneous circumstances and lack of legal encompassment. However, due to public outcry, federal prosecutors took charge by applying the Computer Fraud and Abuse act to the case. This act is typically used to prosecute electronic theft, but in this instance was used to apply the Myspace terms of service. The terms require users to abide by a host of regulations, which “required truthful and accurate registration, refraining from using information from MySpace to harass others [and] refraining from promoting false or misleading information” (“Unites states of America v. Lori Drew,” 2009). Based on MySpace’s terms of service, the jury found Drew guilty of one felony count for conspiracy and three misdemeanors counts for unauthorized computer use. This case caused Missouri to modify its state harassment law to encompass acts of cyberbullying like the Lori Drew case. The law now prohibits any electronic communication that “‘knowingly frightens, intimidates, or causes emotional distress” (Henderson, 2009).

#### Case outweighs

### A2 Trigger Warnings DA

#### No link – getting rid of free speech zones doesn't trade off with trigger warnings or safe spaces for students

#### Trigger warnings sap agency from the oppressed and aren't effective at treating PTSD

Robbins 16 [Susan Robbins (professor of social work at University of Houston), "From the Editor—Sticks and Stones: Trigger Warnings, Microaggressions, and Political Correctness," Journal of Social Work Education, 1/19/2016] AZ

As a profession that increasingly relies on evidence-based practices, it is also important to examine the extant research on trauma treatment. A comprehensive examination of treatment for PTSD has shown exposure therapy to be the most effective intervention for those who have experienced sexual assault. Yet trigger warnings accomplish exactly the opposite by allowing trauma victims to avoid all mention and images related to the trauma, which may in fact have the opposite effect and be reinforcing. In addition, there is sound evidence that reorganizing one’s identity around a traumatic event can exacerbate PTSD and lead to poorer mental health outcomes (McNally, 2014). If we are to foster resilience in our students, trigger warnings may have the opposite effect and keep them embedded in a culture of victimization. Finally, if this trend continues (and I suspect that it will), given the fact that social work education routinely covers most, if not all, the topics that are thought to be triggers, it may be prudent to let applicants to our programs know in advance that such content is mandated by the very nature of our profession. This will allow them to make fully informed choices about entering the field of social work. Permitting students to opt out of lectures or readings to avoid content that may cause discomfort or canceling entire lectures or classes to assuage student fears of emotional distress does a disservice to our students and to the profession.

### A2 Ilaw DA

#### No link – doesn't overturn existing speech codes

#### Limiting hate speech isn't required by international law

Cohen 14 [Roni Cohen (J.D. Candidate, 2015, The University of Chicago Law School), "Regulating Hate Speech: Nothing Customary About It," Chicago Journal of International Law, 2014] AZ

The proliferation of laws prohibiting and punishing hate speech since World War II has raised serious questions concerning the limits of free speech. While all liberal democracies guarantee the freedom of expression as a fundamental human right, the vast majority also restrict speech deemed hateful or racially discriminatory. Similarly, many major international human rights agreements acknowledge free speech as an essential human right, but also limit that right when hateful. This Comment analyzes the current legal landscape surrounding hate speech laws and evaluates domestic and international practice to determine whether the regulation of hate speech has assumed customary international law status. Due to a lack of uniformity among and within states and the absence of opinio juris, or a sense of legal obligation, this Comment concludes that the international practice of restricting hate speech has not yet assumed customary international law status.

#### Turn – free speech is protected by international law

Magnuson 10 [William Magnuson (Associate Professor of Law at Texas A&M University, "The Responsibility to Protect and the Decline of Sovereignty: Free Speech Protection Under International Law," Vanderbilt Journal of Transnational Law, 2010] AZ

1. The Universal Declaration of Human Rights The UN Human Rights Commission, formed in 1946 in the aftermath of World War II, had the express purpose of preparing an international bill of rights that would describe the human rights component of the UN Charter.128 Unsure whether to prepare a declaration or a treaty, it decided to do both: first, a nonbinding declaration, and then a binding convention. 29 In 1948, the General Assembly adopted the Commission's declaration, the Universal Declaration of Human Rights.130 The Universal Declaration sets out individuals' basic civil and political rights, including the rights to life, security of one's person, fair trial, freedom of movement, and freedom of religion and expression.131 With respect to free speech, the Universal Declaration provides, "Everyone has the right to freedom of opinion and expression; this right includes freedom to hold opinions without interference and to seek, receive and impart information and ideas through any media and regardless of frontiers."132 This right is not absolute, though. According to the Universal Declaration, countries may place restrictions "solely for the purpose of securing. . . respect for the rights and freedoms of others and of meeting the just requirements of morality, public order and the general welfare in a democratic society."' The Universal Declaration, as an international instrument, has had an unprecedented level of influence on international norms and state practice. While the Declaration was considered nonbinding by some countries when it was adopted, 34 it was generally understood as being truly universal.135 Indeed, the Universal Declaration has achieved such widespread acceptance that one commentator has stated that it has "become a part of the common law of the world community; and, together with the Charter of the United Nations, it has achieved the character of the world law superior to all other international instruments and to domestic laws." 136 Many countries have incorporated the document into their own constitutions,1 7 and many more have based their constitutions' bill of rights on the protections enumerated in the Declaration.1 3 8 2. The International Covenant on Civil and Political Rights Pressed to complete an international bill of rights, the Human Rights Commission decided to draft a binding covenant in addition to the aspirational Universal Declaration of Human Rights. The result, the International Covenant on Civil and Political Rights (ICCPR), shared many of the provisions included in the Declaration but elaborated more fully on them. The ICCPR also included a (limited) mechanism for hearing complaints from individuals regarding violations of the treaty.139 Again, freedom of expression held an exalted position in the demarcation of rights. According to the ICCPR, the right to hold opinions "without interference" was absolute. 140 No restrictions for any reason were permitted. 141 In addition, freedom of expression included the "freedom to seek, receive and impart information of all kinds, regardless of frontiers, either orally, in writing or in print, in the form of art, or through any other media of his choice." 142 The positive content of the freedom of expression was limited by "special duties and responsibilities." 143 Therefore, the exercise of the freedom of expression could be subject to restrictions that were necessary (1) "for respect of the rights or reputations of others" or (2) "for the protection of national security or of public order, or of public health or morals." 144 The individual right of freedom of expression was protected not just from governmental action but also from the actions of individuals.14 5 The inclusion of a reference to "special duties and responsibilities" accompanying the exercise of the freedom of expression was a controversial proposition.14 6 Countries supporting the inclusion of such a clause argued that free speech was a "precious heritage" that held tremendous power in public opinion and international affairs, thus justifying reference to the responsibilities of speakers.147 But other states, including the United States, argued that all rights carry countervailing duties, and thus any specific reference to the duties inherent to free speech was unnecessary.148 In the end, consensus was reached on a clause that provided for special duties and responsibilities but narrowly limited the kinds of restrictions that could be imposed on the right.149 The resulting definition of the right to freedom of expression was surprisingly broad, given the difficulty of getting so many divergent countries to agree on one version.15 0 3. Convention for the Protection of Human Rights and Fundamental Freedoms In the period immediately after the adoption of the Universal Declaration in 1948, many commentators in Europe worried that a binding treaty regarding international human rights would be difficult if not impossible under the auspices of the UN.' 5 ' Driven by the revulsion towards the recently perpetrated abuses of the Nazi regime, the Council of Europe drafted a Convention for the Protection of Human Rights and Fundamental Freedoms (the European Convention) designed to make the promises of the Universal Declaration binding on its member states. 152 Today, the European Convention stands as the most successful and robust system to protect human rights in the world. The European Convention created two bodies, the European Commission of Human Rights and the European Court of Human Rights, to ensure that member states comply with their obligations.153 An optional protocol empowers individuals to petition the Commission directly for any alleged violation of their rights under the European Convention. 154 The European Convention's provisions regarding freedom of speech are naturally very similar to those provisions in the ICCPR because both documents are based on the Universal Declaration of Human Rights.155 The one exception is the inclusion of a long list of limitations on the freedom of expression in the European Convention. Article 10 of the European Convention states: 1. Everyone has the right to freedom of expression. This right shall include freedom to hold opinions and to receive and impart information and ideas without interference by public authority and regardless of frontiers.... 2. The exercise of these freedoms, since it carries with it duties and responsibilities, may be subject to such formalities, conditions, restrictions or penalties as are prescribed by law and are necessary in a democratic society, in the interests of national security, territorial integrity or public safety, for the prevention of disorder or crime, for the protection of health or morals, for the protection of the reputation or rights of others, for preventing the disclosure of information received in confidence, or for maintaining the authority and impartiality of the judiciary. 15 6 The extensive list of restrictions on an individual's right to exercise his freedom of speech stems from the fewer number of participants in the negotiations and the consequently higher level of consensus between member states as compared to the ICCPR.'57 The temporal and geographical closeness of the war created a stronger unity in Europe with respect to this issue.158 The United States itself would not go so far. Indeed, in the ICCPR negotiations the United States was one of the most active proponents of a relatively unrestricted freedom of speech, for the reason that its own jurisprudence was consistent with such a view.159 4. American Convention on Human Rights In 1948, twenty-one countries in Latin America joined together to defend their territorial integrity and promote peace and justice under the Organization of American States.160 In the same year, a few months before the UN adopted the Universal Declaration, they adopted the American Declaration of the Rights and Duties of Man.161 Just as with the Universal Declaration, a subsequent document, the American Convention on Human Rights elaborates upon the extent of the obligations provided for in the American Declaration. 162 The American Convention, like the European Convention, set up an Inter-American Commission on Human Rights to review alleged human rights violations and an Inter-American Court of Human Rights to hear appeals.163 The right to freedom of expression contained in the American Convention is almost identical to that found in the International Covenant. 164 Article 13 of the American Convention states that "[e]veryone has the right to freedom of thought and expression."165 It also prohibits indirect methods of restricting expression, such as unfair allocation of newsprint or broadcasting frequencies, a restriction that applies both to private persons as well as the government.166 On the other hand, it requires states to prohibit war propaganda and advocacy of national, racial, or religious hatred.167 The American Convention's free speech clauses are the most farreaching of any human rights treaty.168 Indeed, the American Court has articulated the view that the American Convention's guarantees of freedom of expression are "more generous" than those guaranteed in the European Convention.169 The treaty's provisions with regard to free speech evince an intent to reduce to the absolute minimum restrictions on the free exercise of speech. 70

#### **Outweighs their** link **– a. international law on hate speech prohibitions isn't binding – that was above, and b. our ev is comparative between restrictions on free speech and the value of expression – the American convention values speech higher**

### A2 Wisconsin Modeling

#### Just one example – doesn't prove every college follows this model

#### Actually, it's a patchwork of different regulations

## NCs

### A2 Hobbes NC

#### On framework –

#### Assumes the initial social contract was legitimate – future generations didn't consent to the sovereign so the contract is no longer binding

#### Birthplace is arbitrary, so any theory based on borders violates the axiom of equality

#### "Contractual necessity" doesn't imply absolute sovereignty – if the government fails to promote the original purpose of the contract, then sedition is permitted

#### On the contention –

#### Speech is a prerequisite to determining if the sovereign is legitimate – denying the value of speech for determining ethics is a performative contradiction since that's exactly what framework debate is.

#### Turn – the highest sovereign in the US is the USFG, not public colleges. Since the Supreme Court has commanded colleges to protect speech, removing restrictions is key to complying with the sovereign.

## T

### A2 T – Any

#### Oxford Dictionary defines any as

1.4 Withhold (information) from general circulation or disclosure.

#### Debate over the scope of academic speech is robust and valuable to learn about

Blank 17 [Rebecca Blank (current chancellor of the University of Wisconsin-Madison and former Acting United States Secretary of Commerce), "On Academic Freedom and Free Speech," 1/8/2017] AZ

The recent public debate over a course offered this coming semester, African Cultural Studies 405, “The Problem of Whiteness,” is not particularly unusual. Every university that I have been at has experienced occasional controversy about a professor or a course that presents material others find offensive. Universities are unique places, characterized by their acceptance of people who push the boundaries of perceived truth. Universities frequently employ faculty members whose opinions are considered “out there” — people who embrace alternative ideas and identities that surprise (and occasionally shock or anger) others. This includes the researchers who proposed that ulcers were caused by bacteria rather than stress and who were widely derided and dismissed…until research proved them right. It includes those who write about (and sometimes live) alternative forms of gender identity. It includes those who argued for plate tectonics, the big bang theory, the value of a minimum wage, or the idea that race is a socially-constructed concept. All of these were or are hotly controversial topics in their field and even among the general public. I’ve always thought that universities’ greatest value to society is that they are places where any idea is thinkable and debatable…even ideas that shock and insult. A university’s commitment to academic freedom and free speech is a commitment that allows all ideas to be presented and discussed. Ideas should be dismissed only after research and debate proves them inadequate, rather than being dismissed out of hand without debate because they challenge perceived wisdom or offend current beliefs. That is what the famous UW Board of Regents’ statement was all about, when they proclaimed their support of “continual sifting and winnowing by which alone the truth can be found.” This was an unambiguous statement about the need for all voices to be heard at a university, in response to an effort to fire a faculty member, economist Richard Ely, accused of advocating socialism. Now, anyone who is around a university knows that we often fall short of these ideals. Certain opinions in any field of inquiry are dismissed or even laughed at. Sometimes that dismissal is based upon serious inquiry and debate and sometimes it’s just based on current fads and prejudices. But what we’ve learned over the centuries of arguing about different scientific theories and different social beliefs is that we can all be surprised about where the truth is ultimately found. Those who are dismissed and laughed at today may be taken very seriously at some point in the future. At universities, if we really want to pursue ideas wherever they take us, we can’t censor discussion by only talking about those ideas that others find acceptable. That brings us to the African Cultural Studies course that is the subject of the current controversy. By itself, the content of this course actually isn’t very controversial. Its approach and its readings are similar to many courses offered at other universities on the social construction of race, studying how the majority culture in many societies has utilized racial concepts to constrain and marginalize minority cultures. Universities have a long tradition of giving faculty freedom in the classroom to teach about a topic. And, I might note, universities also typically give students a lot of freedom about which classes they can choose to attend. If a faculty member is unable to attract students into his or her course, then we will typically cancel it and assign the professor to a different course. If we receive significant student complaints about a professor’s lack of teaching skills, we will try to provide assistance to that professor to improve. If a faculty member bullies or personally attacks individual students in the course of teaching, we will discipline that professor. But if a faculty member makes arguments in the classroom that some find objectionable or even believe to be wrong, we do not interfere. In fact, as chancellor, I will strongly defend the right of any faculty member to present highly controversial opinions. Faculty who teach well about controversial subjects are often much in demand. Departments determine their curriculum and faculty are typically assigned a certain number of classes needed by the department to fulfill their curricular requirements. These courses go through a vetting process by a university-level curriculum approval committee. But many faculty occasionally teach special topics courses that reflect their particular research interests, and those may change from year to year. Departments have the right to approve a special topics course on a one-time basis, without a broader curricular review, which is how African Cultural Studies 405 is being offered. The reaction to the course title, The Problem of Whiteness, has been particularly loud. In part, this title uses language in a way that is familiar to academics but not to others. In academic use, “The problem of…” is language that signals “this is a topic worthy of conversation and debate”, not “this is something that creates problems.” A recent report by the National Academy of Sciences on effective communication by scientists suggested that researchers need to not only avoid jargon, but also understand that people interpret information based on their social norms, which can lead to misunderstanding of the original intent. Indeed, the National Science Foundation has issued guidelines for how project summaries should be written so that the value of the project is clearly understood by national legislators and their staff. I encourage all of our faculty to think about the outside as well as the inside audiences as they put together courses, write articles, and speak publicly. The more that we can use language that all of our audiences understand, the better we will be in communicating the value of the university to the state. The current controversy over this specific course was amplified because the professor also has a strong social media presence and it didn’t take long for critics to uncover Twitter postings that appear to express enjoyment at hearing about the shooting of police officers. This moves the debate about academic freedom and free speech beyond the freedom to teach in the classroom. If an employee in a private company posted twitter statements entirely unrelated to her employment that the employer and customers found objectionable, could that employee be fired? That’s certainly possible. But again, universities – especially public universities – are unique. Twitter postings are public statements. They are like posting a message on a public bulletin board. Universities provide their faculty a guarantee of academic freedom in the classroom, but like any person, faculty members also enjoy freedom of speech from public sanction in the public domain. In fact, the famous “sifting and winnowing” case occurred because Professor Ely was giving public speeches that some thought advocated socialism. It was the 1890s version of Twitter postings. I have looked at these Twitter postings and I do not accept nor condone the opinions that they seem to express. But my distaste is trumped by my responsibility as chancellor to defend the principles of both academic freedom in the classroom and free speech outside the classroom. It is not acceptable to fire faculty because they publicly say things that others find objectionable, because that’s a very slippery slope. What about those who don’t like faculty who talk about global warming? Or those who don’t want faculty to discuss gay culture? Or those who don’t want faculty to present their research analyzing the cause of a specific disease because it utilized fetal tissue? If faculty have the freedom to present their opinions, then there can’t be arbitrary limits set on which opinions can be presented and which cannot. Defending academic freedom and free speech can be uncomfortable. I hear about it when alumni or legislators or citizens are unhappy about what’s happening here on campus. There are days when I really wish that everybody at UW would stop doing anything that might create controversy. But once that happens, then we are no longer a university, engaged in the intellectual debate and ferment that leads to new ways of thinking and new innovations. Academic freedom and free speech are among the most important foundations on which universities are built.

### A2 T – Not Research

#### Counterinterpretation –

#### Academic research is a form of protected speech

Smith 2 [Stacy Smith (JD candidate), "Who Owns Academic Freedom?: The Standard for Academic Free Speech at Public Universities," 2002] AZ

Freedom of inquiry and scholarship is critical to informed political debate and useful social discoveries. " The freedom to pursue research and the right to transmit the fruits of inquiry to the wider community - without limitations from corporate or political interests and without prior restraint or fear of subsequent punishment - are essential to the advancement of knowledge.355 Thus, when academic freedom is at issue, courts should apply full First Amendment strict scrutiny rather than the Pickering-Connick standard." As demonstrated by Urofsky, if courts apply the Pickering-Connick balancing test to academic freedom litigation, the result can be an imposition of severe restrictions on traditional and legitimate professional speech by faculty at public colleges and universities. 3 7 These restrictions impede faculties' ability to teach, share research findings, and publish, especially when doing so might prompt adverse public or political reactions. The Supreme Court warned that such restrictions would harm not only the interests of individual professors, but also the welfare of the public and the nation.358 Disinterested scholarship and research is crucial to individual faculty members and to society as a whole. In noting the importance of freedom of inquiry in the development of modem civilization, the Supreme Court in Sweezy observed, "[s]cholarship cannot flourish in an atmosphere of suspicion and distrust. Teachers and students must remain free to inquire, to study, and to evaluate, to gain new maturity and understanding; otherwise civilization will stagnate and die."359 Unfortunately, by failing to appreciate the distinction between garden-variety public employee speech and academic free speech or inquiry, the Fourth Circuit assaulted a fundamental bulwark of First Amendment protection.36

#### Standards

#### overlimiting – this topic is incredibly small, a harm magnified by five months of debating prior to TOC. Expanding aff ground to research plans is necessary to prevent stale and repetitive debates that rehash the speech codes good/bad rounds or endowments DA.

#### Ground – debate about research is valuable education

### A2 T – Not Research – Extra Ev

#### Science research is a form of expressive conduct, which is protected speech

Ram 17 [Natalie Ram (Assistant Professor, University of Baltimore School of Law), "Science as Speech," Iowa Law Review, 2017] AZ

One of the primary theories for First Amendment protection for scientific methodologies argues that such methodologies are expressive conduct—nonverbal conduct that is constitutionally protected expression. Under this theory, O’Brien established a baseline for regulating expressive conduct.112 The Supreme Court concluded that even if O’Brien’s actions— burning his draft card in protest—were expressive, Congress could legitimately proscribe them because the statute barring draft-card destruction served “an important or substantial government interest,” that was “unrelated to the suppression of free expression,” and “the incidental restriction” of O’Brien’s First Amendment freedoms was “no greater than is essential to the furtherance of that interest.”113 Following O’Brien, the Supreme Court held that a number of statutes prohibiting flag desecration violated the First Amendment’s free-speech guarantee. In Spence v. Washington, for instance, the Court held that the State’s interest in prohibiting flag desecration was directly related to Spence’s expression, and that the prohibition was therefore antithetical to the First Amendment’s protection of expression.114 In reaching this conclusion, the Court held that expressive conduct exists where there is “intent to convey a particularized message” and a “great” likelihood “that the message would be understood by those who viewed it.”115 Because Spence’s conduct met these requirements, his conviction entailed “prosecution for the expression of an idea through activity.”116 In Spence, unlike in O’Brien, the statute was concerned with the protest message expressed by the flag desecration, not with the hazards of the physical conduct itself. On the basis of these cases, some proponents of protected scientific experimentation draw an analogy between burning a draft card or desecrating a flag and employing scientific methodologies. Implementing scientific methodologies, they argue, “inten[ds] to convey a particularized message” likely to “be understood by those who view[] it,” as required under Spence.117 But it is far from obvious that scientific experimentation survives such an analogy. With respect to the first prong of Spence’s formulation of expressive conduct, that such conduct must “inten[d] to convey a particularized message,”118 it is not at all clear that merely implementing scientific methodologies conveys any message, much less a particularized one. Research methods are not themselves expressive. They seek information; they do not convey meaning. An experiment may or may not verify the scientist’s (protected) ideas about the world, but carrying out that experiment is not directly expressive. The relationship between researcher and research materials speaks to Spence’s second requirement that there be a “great” likelihood “that the message would be understood by those who viewed it.”119 A scientist does not engage in expression when she applies research methodologies to “materials within [her] lawful control.”120 Under Spence, often, the only “viewer” of a scientist’s conduct in the act of implementing research methodologies is the research materials. Indeed, Spence’s second prong makes clear that expressive conduct requires at least two conscious communicators—one to convey and another to receive.121 Where applying scientific methodologies is concerned, there is often only one conscious communicator. Other courts have also recognized that expressive conduct requires two conscious communicators. In Universal City Studios, Inc. v. Corley, the Second Circuit held that computer object code is expressive and “speech” protected under the First Amendment.122 Although object code instructs a computer to operate in certain way, it can also function as a message between programmers. Object code is a language that may be the medium for the expression of ideas between one programmer and another. Scientific experimentation, meanwhile, often involves only the researcher and her research materials (which are themselves often inanimate or incapable of consciousness). Subsequent sharing and analysis of experimental results may properly involve expressive activities, but the experimental conduct itself generates information in only one direction. This type of conduct is not inherently expressive. This conclusion is further compelled by the Supreme Court’s discussion of expressive conduct in Rumsfeld v. Forum for Academic and Institutional Rights (“FAIR”).123 In FAIR, the Supreme Court declined to recognize law-school recruiting as expressive conduct. In so doing, the Court recognized that, although some conduct is protected under the First Amendment, this protection extends “only to conduct that is inherently expressive.”124 Moreover, the Court reiterated its rejection of the “view that ‘conduct can be labeled “speech” whenever the person engaging in the conduct intends thereby to express an idea.’”125 In distinguishing the non-expressive conduct of law-school recruiting from the expressive conduct protected in Spence and related cases, the Court wrote, “law schools ‘expressed’ their disagreement with the military by treating military recruiters differently from other recruiters. But these actions were expressive only because the law schools accompanied their conduct with speech explaining it.”126 The Court continued, finding: The expressive component of a law school’s actions is not created by the conduct itself but by the speech that accompanies it. The fact that such explanatory speech is necessary is strong evidence that the conduct at issue here is not so inherently expressive that it warrants protection under O’Brien. If combining speech and conduct were enough to create expressive conduct, a regulated party could always transform conduct into “speech” simply by talking about it.127 Spence’s message was clearly expressed simply through his defacing of an American flag—no talking required. Scientific methodologies, conversely, are not themselves typically a medium for expressing ideas. Like the Court’s treatment of law-school recruiting, scientific experimentation requires speech (as well as analysis) in order to give it expression and dissemination. As such, scientific experimentation is a medium for generating knowledge that may subsequently be expressed—but it is not expression itself. To be sure, scientific experimentation may sometimes involve groups of individuals. Researchers are not hermits, toiling away alone in laboratories and experimenting only with inanimate materials. To the contrary, research involving human subjects is commonplace.128 Researchers also frequently work in teams to tackle complex research questions.129 In these contexts, communication among collaborating researchers, and between researchers and study participants, might well trigger First Amendment protection as pure expression or expressive conduct.

#### Academic freedom is free speech – Supreme Court precedent

Roig 16 [Jorge R. Roig (Assistant Professor of Law, Charleston School of Law, Charleston, South Carolina; Juris Doctor, University of California at Berkeley, Boalt Hall School of Law, 2000; Bachelor of Arts with Honors in Economics, Harvard University, 1997), "Can DNA Be Speech?" Cardozo Arts & Entertainment Law Journal, 2016] AZ

However, there is plenty of Supreme Court precedent extending robust First Amendment protection to academic discourse. “Our Nation is deeply committed to safeguarding academic freedom, which is of transcendent value to all of us, and not merely to the teachers concerned. That freedom is therefore a special concern of the First Amendment, which does not tolerate laws that cast a pall of orthodoxy over the classroom.”207 “[T]he First Amendment protects scientific expression and debate just as it protects political and artistic expression.”208 This is why “scientific seminars, discussions, and publications are covered by the First Amendment.”209 “Authors routinely write books and articles in which they communicate procedures to each other. . . . [S]uch writings are unambiguously covered by the First Amendment.”210

#### Scientific research is a form of constitutionally protected speech

Ferguson 79 [James Ferguson (Law Clerk to Judge William J. Bauer, United States Court of Appeals for the Seventh Circuit. J.D. 1976, Northwestern), "Scientific Inquiry and the First Amendment," Cornell Law Review, 1979] AZ

Simply stated, the constitutional claim of scientific inquiry holds that the research enterprise of scientists has a first amendment importance because it is essential to the ability of individuals to engage in scientific expression. The argument thus proceeds on the assumption that scientific expression is itself protected by the free speech clause of the first amendment. This initial premise entails no sharp break from accepted first amendment principles; indeed the Supreme Court has strongly hinted on several occasions that scientific speech is a protected form of expression. 19

### A2 Ground

#### Research affs are predictable – Newark's been reading an academic freedom aff since the Cal Round Robin, and both Dougherty Valley and Peninsula have been reading research PICs on the neg.

#### No ground loss – generic args about endowments and critiques of speech in the context of professors will still apply

#### Too bad – minimal ground loss is outweighed by overlimiting – expanding education on a breadth of issues is far better than the same debates again and again.

### A2 Limits

#### Our interp doesn't add that many affs to the topic

#### Overlimiting outweighs underlimiting – overlimiting

### A2 Scarsdale Kant NC

#### Their framework assumes that colleges have a consistent intention, which is false:

#### Colleges change administrations

#### Colleges are conglomerates of many administrators and professors with different aims

#### Their frameworks start from the position of equal access which is not actually met, obligating us to correct injustice

Bruenig 14 [(Matt, cites political theorist Charles Mills) “Charles Mills on White Liberalism”] AT

One such methodological assumption, Mills argues, is the assumption that the proper way to philosophize about political justice is through the use of "ideal theory." Under an ideal theory approach to theorizing about politics, the requirements of justice are derived by imagining how best to construct a system from scratch at the beginning of history. You see this ideal theory approach present in theorizing about the "state of nature," the "veil of ignorance", and the "original position" more generally. In all cases, you essentially construct an ideal society at the beginning of time and then use that ideal society to determine the justness of institutions in actually-existing societies and to prescribe ways to make those societies more just. The decision to use ideal theory to ferret out the requirements of justice is not, according to Mills, a neutral one. Instead, it is one that tracks the justice concerns of the white philosophers who comprise the tradition that continues to this day to rely on this method. For white philosophers, expository devices that operationally exclude all of history pose no particular problem. History is largely irrelevant to the kinds of justice concerns that press upon white populations. To the extent that it is relevant, it's only marginally so and therefore easily relegated to an after-the-fact special consideration that is separate from the core theories. This is not the case for non-whites as the ghosts of historical injustices heavily factor into their present justice needs. For these populations, the issues of rectificatory and reparative justice are not secondary issues best treated as footnoted exceptions. Rather, they are center stage. Whereas white philosophers operating in the racially-exclusionary liberal tradition find it most fitting to start with ideal theory and then move on to non-ideal historical problems as a side issue, a less racially-biased philosophical tradition would go in the reverse order. Abstract thought experiments that walled off history (as in ideal theory) would at minimum be replaced with ones that fully included history into their considerations. Instead of asking, as in Rawls, what kind of political institutions people would select at the beginning of time if they didn't know who in that society they'd wind up being, you would ask what kind of institutions those same people would select if they knew the society they would blindly enter into has a legacy of racist oppression that has set the stage for lasting racial disparities. That the liberal tradition continues to select the ideal theory approach to contemplating justice, even as it marginalizes the justice concerns of non-white people, is, according to Mill, a legacy of its racist origins and the philosophical methodologies those origins set in place.

#### No link – the plan doesn't overturn speech codes or anti-harassment laws – only zoning where free speech is allowed

#### Turn – federal research funds are a form of coercion by unjustly taxing citizens – rejecting research projects is key

#### Missing internal link to the NC – colleges wouldn't be responsible for hate speech since they don't cause it

### A2 Sedition Bad

#### Revolution is sometimes needed – Kant agrees

Cummiskey 8 [David Cummiskey, "JUSTICE AND REVOLUTION IN KANT’S POLITICAL PHILOSOPHY," Current Trends in American Kantian Scholarship; Cambridge Scholar Publishers 2008] AZ

Although Kant rejects happiness based principles of justice, his theory of justice has a clear consequentialist element. The juridical postulate of practical reason (the duty to make property possible) entails a duty to bring about a state of affairs where reciprocal property rights are determined by and enforced by a united general will. We are to do whatever is necessary, including using violent means, to bring about this juridical state of affairs. Given these consequentialist aspects of Kant’s theory of justice, in principle, it must be permissible to use coercive or violent means to undermine, reform, or remove a regime using coercive power to perpetuate a non-juridical state of affairs. Whether, in any particular circumstance, violent revolutionary activity is also advisable must be determined by difficult, pragmatic, consequentialist considerations. Caution should, of course, rule such decisions. Still, there are unfortunate cases where the calculus is clear and action is called for. Revolution is not only permissible, it is also, regrettably, sometimes required.

#### And, restricting freedom of speech puts the sovereign in contradiction with its supreme authority, undermining the omnilateral will.

Suprenant 15 – bracketed for gendered language Chris W. “Kant on the Virtues of a Free Society” April 7th 2015 <https://www.libertarianism.org/columns/kant-virtues-free-society> JW

The second point is a bit less straightforward. His claim is that a sovereign that outlaws free speech creates a condition where [her] ~~his~~ actions “put [her] him in contradiction with himself.” This language is remarkably similar to what he uses in his moral theory to describe principles that violate the categorical imperative, Kant’s supreme principle of morality. In the Groundwork, Kant claims that when a principle of action fails when tested against the categorical imperative, it fails because something about that principle is contradictory. It may be the case that it is not possible to conceive of the action that comes about as a result of universalizing the underlying principle connected to the action (i.e., a contradiction in conception), or the result of universalizing the principle is self-defeating in some way (i.e., a contradiction in the will). In the case of the sovereign restricting freedom of the press, the contradiction appears to be more practical. Elsewhere Kant argues what justifies sovereign authority is that his actions are supposed to represent the united will of the people (MM 6:313). But a sovereign that denies free speech and otherwise undermines the conditions necessary to maintain a free society has made it impossible to gather the information needed to represent the will of the people appropriately. In this way, Kant sees any attempt by the sovereign to limit or otherwise suppress the free exchange of ideas, and, in particular, the exchange of ideas among the educated members of society (e.g., academics), as undermining his own authority.

#### Seditious speech promoting substantive evil can be restricted

CRF no date [Constitutional Rights Foundation, A "Clear and Present Danger"] AZ

Thus, according to Justice Douglas, "freedom of speech, though not absolute, is protected against censorship or punishment unless shown likely to produce a clear and present danger of serious substantive evil that rises far above public inconvenience, annoyance or unrest."

### A2 Must Have Trigger Warnings

#### Counterinterpretation – the affirmative does not have to give a trigger warning before [whatever]

#### Trigger warnings sap agency from the oppressed and aren't effective at treating PTSD

Robbins 16 [Susan Robbins (professor of social work at University of Houston), "From the Editor—Sticks and Stones: Trigger Warnings, Microaggressions, and Political Correctness," Journal of Social Work Education, 1/19/2016] AZ

As a profession that increasingly relies on evidence-based practices, it is also important to examine the extant research on trauma treatment. A comprehensive examination of treatment for PTSD has shown exposure therapy to be the most effective intervention for those who have experienced sexual assault. Yet trigger warnings accomplish exactly the opposite by allowing trauma victims to avoid all mention and images related to the trauma, which may in fact have the opposite effect and be reinforcing. In addition, there is sound evidence that reorganizing one’s identity around a traumatic event can exacerbate PTSD and lead to poorer mental health outcomes (McNally, 2014). If we are to foster resilience in our students, trigger warnings may have the opposite effect and keep them embedded in a culture of victimization. Finally, if this trend continues (and I suspect that it will), given the fact that social work education routinely covers most, if not all, the topics that are thought to be triggers, it may be prudent to let applicants to our programs know in advance that such content is mandated by the very nature of our profession. This will allow them to make fully informed choices about entering the field of social work. Permitting students to opt out of lectures or readings to avoid content that may cause discomfort or canceling entire lectures or classes to assuage student fears of emotional distress does a disservice to our students and to the profession.

## to integrate

### new aff

NOTES:

COUPLE OF DIFFERENT RESEARCH ISSUES:

-There are lots of restrictions on what research can be carried out

-NSDD is supposed to exempt fundamental research from these restrictions

-however, it is being eroded now – academics at universities are increasingly unable to do fundamental research

-occurs in the form of gov’t classification – most universities prohibit their people from doing classified research, because otherwise they’d have to monitor or segregate those researchers. Some universities allow it; then the researchers are limited in their ability to disseminate it. Either case is a restriction, probably can’t defend this.

-contracting – when gov’t provides contracts, they often include language limiting the types of research that can be carried out.

http://vcresearch.berkeley.edu/research-policies/policy-guidelines-governing-openness-and-freedom-to-publish

-"restrict" means to withhold information from general circulation - topic is about limiting academic inquiry

#### Fundamental research

NRC 07 [(National Research Council (US) Committee on a New Government-University Partnership for Science and Security) Science And Security In A Post 9/11 World: A Report Based On Regional Discussions Between The Science And Security Communities, NCBI Bookshelf 2007] AT

Export Controls and Deemed Exports The federal government also attempts to control the flow of information and materials through export control and arms trafficking regulations. Specifically, the Department of Commerce implements the EAR that bars the export of items, technology, and technological information found on the Commerce Control List33 to foreign countries without appropriate export licenses. The EAR covers the transfer of dual-use commercial goods. In addition, the Department of State implements the ITAR, which regulates the export of items, technology, and technological information maintained on the U.S. Munitions List.34 The ITAR focuses on armaments and military technologies. Both the EAR and the ITAR contain exclusions for fundamental research. However, some research can be subject to both sets of regulations. Participants at the committee’s regional meetings noted that these lists are out of date, in part because other countries’ technologies have surpassed those of the United States in some areas. Several meeting participants noted that many of the items on the Commerce Control List and the U.S. Munitions List are outdated technologically and broadly available and not controlled in other countries. Yet companies and universities are required to comply with the lists. In addition to these export controls, “deemed exports” refer to the transfer of controlled information to a foreign national within the United States, such as a foreign scientist working in a university laboratory.35 “Universities generally rely on the fundamental research exclusion to exempt the research performed there from export control.”36 Otherwise, for foreign nationals working in U.S. laboratories to have access to this controlled information, the institution must apply for a license. According to Sue Eckert, Senior Fellow at the Watson Institute for International Affairs at Brown University and former Assistant Secretary of Commerce for Export Administration, approximately one thousand deemed export licenses are requested every year and only one percent are denied.37 Under the National Defense Authorization Act (NDAA) for Fiscal Year 2000, the IGs of the Departments of Commerce, Defense, Energy, and State, in consultation with the Directors of the CIA and FBI, are required to conduct an eight-year assessment of the adequacy of current export controls and counterintelligence measures to prevent the acquisition of sensitive U.S. technology and technical information by countries and entities. In April 2004, these offices issued seven reports focused on deemed exports regulations, including an interagency review that summarizes the findings and recommendations of the six individual agency reports. The reports of the Department of State, DHS, and CIA remain either classified or publicly unavailable. The publicly available agency reports were particularly troubling for research universities because they called for a re-examination of several federal export license rules from which universities have historically believed they were exempt. Given that the primary mission of the university system is the dissemination of knowledge, the potential for conflict was considered substantial. The Department of Commerce IG report was the first to attract the attention of the university community for two reasons: 1) it contained a surprising change in the interpretation of existing regulations, and 2) a large number of items would be affected by the changes suggested in the report, including common laboratory tools such as furnaces, portable electric generators, gas leak detectors, centrifuges, and fermenters. With regard to the first issue, universities long assumed that fundamental research was excluded from deemed export regulations. The Commerce IG report, however, concluded that only the outputs of research (e.g., publications) were excluded; the inputs (e.g., access to controlled equipment used in the conduct of research) were not. The rationale for this interpretation was that the fundamental research exclusion, NSDD-189, exempts that which “arises from or during” fundamental research. As the CSIS White Paper on Security Controls on Scientific Information and the Conduct of Scientific Research points out, that rationale is clearly wrong: Inconsistency with NSDD-189. The Inspector General’s report contains only a passing reference to NSDD-189, and that discussion deals only with the results of fundamental research; it makes no mention of the Directive’s parallel discussion of the conduct of such research. Perhaps for this reason, the IG report does not address the apparent inconsistency between its recommendation to expand deemed export controls and NSDD-189’s direction that “no restrictions may be placed upon the conduct … of [unclassified] federally-funded fundamental research”… Admittedly, the same inconsistency can be found in the position of the Commerce Department’s Bureau of Industry and Security, which according to the IG report asserts that “technology relating to controlled equipment … is subject to the deemed export provisions even if the research being conducted with that equipment is fundamental”… Nevertheless, the Bush Administration’s reaffirmation of NSDD-189 can be interpreted to mean that deemed export controls should not be applied at all to fundamental research, much less expanded. Nonetheless, the Department of Commerce continues to distinguish research results and conduct. Some have argued that the first error is “the assertion that not only is the deemed export rule consistent with NSDD-189, but that NSDD-189 clarifies that the product that results from fundamental research is distinct from the conduct involved in the research.”38 Although NSDD-189 may clarify that the two are distinct, the directive categorically asserts that they are to be treated the same. Thus, regardless of whether or not the conduct of research is differentiated from the product of research, neither one should be subject to these controls. In addition to these new interpretations of existing regulations, the Commerce IG report was troubling to the research community because of the number and scope of research activities that would be affected if a blanket “fundamental research exclusion” no longer applied. The research community initially interpreted the IG’s proposal to mean that licenses would be required for foreigners to have access to all items on the extensive Commerce Control List, making the impact on research unimaginably large. Additionally, far-ranging discussions ensued over the surprisingly major implications of the Commerce IG’s proposal to change the word “and” to “or” in the list of disallowable knowledge transfer activities (e.g., operation, installation, maintenance, repair, overhaul, and refurbishing). The report also suggested that, while U.S. Green Card holders could be assumed to have a U.S. affiliation, the IG recommended that deemed export policies be determined by the country of origin of non-U.S. residents, in addition to or notwithstanding their country of most recent citizenship. For example, permanent residency in Canada should not automatically lead to the assignation of “Canada” as the country of affiliation for an individual born in China. This proposed change generated a tremendous controversy in industry and academia. In response to widespread concern in the academic community about the changes proposed in the IG report, the Department of Commerce Bureau of Industry and Security (BIS) officials engaged in public meetings and onsite campus visits.39 After many long discussions with the university community, site visits to a number of willing host institutions, and the National Science and Technology Council’s formation of a task force on deemed exports (co-chaired by DOD and DOE), the Department of Commerce published a request for comments in the Federal Register on the IG’s proposed changes. Because of the overwhelmingly critical responses to the proposed changes, in July 2006, BIS announced its withdrawal of the Advanced Notice of Proposed Rulemaking and the establishment of a Deemed Export Advisory Committee (DEAC) charged with evaluating policies and recommending actions. While the announcement was generally welcomed by the university research community, one aspect remains a concern. In the announcement BIS distinguishes the information or product (i.e., a scientific paper) that results from fundamental research from the conduct that occurs within the context of the research.40 The product is not subject to the EAR, but a license still may be required if “during the conduct of the research controlled technology is released to a foreign national.” The announcement goes on to assert that this distinction between the research results and the conduct of fundamental research is consistent with NSDD-189. Under the BIS interpretation, licenses still may be required for access to controlled-use technology unless it meets the “publicly available” or other exclusion. So the research community remains concerned about the status of NSDD-189 and the fundamental research exclusion as evidenced in discussions at the Georgia regional meeting with then Commerce Undersecretary David McCormick. At that meeting the Undersecretary indicated that DEAC would take up the matter of the status of NSDD-189 if it identified it as an issue worthy of high-level attention. In 2005, DOD issued a proposed rule responding to the DOD IG’s March 25, 2004, report. The proposed rule would add an additional clause to DOD contracts that may involve export-controlled information or technologies and would mandate compliance plans that would include “unique badging requirements for foreign nationals and foreign persons and segregated work areas for export-controlled information and technology.”41 The university community objected to the proposal, with many noting that the proposed rule went beyond the current requirements in export control regulations and failed to acknowledge the fundamental research exclusion. Following much discussion with academic and industry groups, in 2006 DOD issued a new proposed rule. The 2006 proposed modifications would alter the intent and language of the agency’s 2005 proposed rule on export controls. The revised language acknowledges the “fundamental research exclusion” for academic research from export licensing requirements. It also no longer requires that universities and medical schools with certain types of DOD contracts maintain unique identification badges and segregated work areas for foreign nationals where certain technology is involved. This second proposed rule includes: …less prescriptive contractor requirements, in recognition of existing related Department of Commerce and Department of State regulations; addresses the responsibilities of the requiring activity in identifying acquisitions involving export-controlled information and technology; and contains three separate contract clauses tailored for use in contracts for research and development, fundamental research only, and supplies or services.42 Even with the withdrawal of the proposed changes in the Commerce language and the revisions to the DOD language, academic institutions are still likely to encounter difficulties interpreting and implementing the deemed export requirements. A Congressional Research Service report summarized the problems: …members of the academic community cite problems administering use controls, including ambiguity about identifying which equipment or material in university laboratories is subject to export controls; discrimination on the basis of nationality; difficulty in controlling access of students and researchers in university laboratories; time required to obtain licenses and inflexibility in obtaining licenses; modest security benefits; slowing or preventing important discoveries due to licensing delays; loss of research talent if students and researchers study in other countries; and reduction in research at the leading edge of science.43 On the other hand, those in the intelligence and security communities are committed to identifying and controlling threats within our borders—thus, the tension. At the inaugural meeting of the committee, Michelle Van Cleave, Office of the National Counterintelligence Executive, reminded the committee of the intelligence community’s mission: It will sound familiar to many of us who have looked at the whole question of the prosecution of the global war on terrorism and what it means to be able to understand the presence of terrorist activities in the United States and how vital and important it is that we find ways to know where terrorists may be recruiting and training and planning operations within the United States, preparing for attacks, that kind of a compelling mission to deal with terrorist threats, to protect the American public, has been one that has animated the President's national security strategy in the global war on terrorism, where he has said that we are not going to sit back and wait for these threats to manifest themselves and harm us here.44 In December 2006, the U.S. Government Accountability Office reported that “The federal government is not doing enough to ensure that colleges are keeping sensitive technologies out of the hands of foreign spies and terrorists.”45 Participants at the Georgia Tech regional meeting expressed their belief that the current Control Lists trivialize the real issues for concern and that a serious effort must be made to reduce the number of items on the lists. Statements by law enforcement and federal officials that export controls are not an effective way to address national security threats reinforced this perception.46 As stated by DHS Assistant Secretary for Policy Stewart Baker, “I will posit that immigration policy, visa policy, export control policy is not the answer. I'm not convinced that we have the answer.”47 In October 2006, the Council on Governmental Relations sent a letter to DOD expressing its concerns about the evolving policy, including, “the conceptual framework for use of the three DFARS contract clauses set forth in the proposed rule, the characterization of the fundamental research exclusion from export controls, and the need to address what happens when there is disagreement between DOD and university contractors. …[We] remain concerned about assuring the necessary level of understanding of the export regulations on the part of DOD program and contracting staff.”48 COGR emphasized its concern “that it is inappropriate for DOD contracting officers to make determinations on the applicability of export controls,” adding that “contractors have the legal responsibility to comply with these requirements, and they are in a better position to determine whether the fundamental research or other exclusion or license exclusion applies to the performance of particular projects.”49 Although the committee applauded the willingness of the Departments of Commerce and Defense to consider the concerns of the university community, it expressed the belief that additional work needs to be done on export controls. Consequently, the committee makes the following recommendation: Recommendation 4 : In view of the growing globalization of technology and science, the Departments of Commerce and State should conduct regular government-wide reviews of export control policy with special emphasis on streamlining, removal of outdated items, and updating the Commerce Control List and the U.S. Munitions List to reflect current status in technology and science and to identify truly unique and military critical technologies unavailable elsewhere. The proposed new Science and Security Commission (Recommendation 12) should work with the Departments of Commerce, Defense, and State in moving this review forward.

#### Academic contracts

Katharine Gelber 16 [(Katharine Gelber, ) Changes to academic contracts threaten free speech, University World News 10-14-2016] AT

Some universities are attempting to insert new clauses into their employment contracts that aim to limit academics’ ability to speak freely in public debate. All universities acknowledge the role that academics have in public engagement. The University of Sydney, for example, states that staff “are encouraged to engage in debate on matters of public importance”. The University of Queensland states that staff are encouraged “to contribute to public debate and media comment”. Universities recognise that staff are free to make public commentary, as long as it does not prevent them carrying out their normal duties – and as long as they do not claim to be speaking on behalf of the university. There are also usually other limits imposed on academics’ ability to comment publicly, such as not engaging in harassment, vilification or defamation. However, it has been reported that some universities are trying to extend or redefine misconduct to prevent academics from speaking out on any matter that is not directly confined to their area of expertise. Defining area of expertise At Melbourne University it has been reported that management recently proposed restricting academics’ ability to comment publicly to their areas of expertise. The university soon backed down on this proposal, and now states that it recognises the right of academics to speak freely in public discourse on any matter. In spite of the backdown, this was an interesting development. While academics conduct research and develop a speciality within their own discipline, the boundaries of their specialities are also unclear. Political science academics, for example, often comment on political issues in the news even though their speciality might be in elections, political theory, international organisations, or political parties. Limiting the freedom to speak publicly to only one’s area of expertise opens the door to management making arbitrary decisions on the boundaries of academics’ expertise. Trying to define an academic’s area of expertise in a confined way could undermine the ways in which they are able to bring their perspectives to bear on complex social problems. More importantly, it would not acknowledge the special role that academics have in public discourse. This derives from their dedication to creativity in intellectual life and the pursuit of new knowledge. Trying to restrict the topics on which academics can speak publicly is a limitation on their academic freedom – and therefore a restriction on their freedom of speech. This is not the only mechanism that has been suggested to restrict academic freedom. In recent negotiations at Murdoch University over the terms of a new collective employment agreement, it was reported that the university wants to include in its definition of misconduct actions that might risk the “reputation, viability or profitability of the university”. As well as resting on highly subjective terms – who would determine whether something risked a university’s reputation or profitability? – this is a significant extension of the meaning of misconduct. Misconduct usually includes things like theft, assault, making up data instead of actually doing the research, improperly giving a benefit to a family member, or disclosing confidential data. Whether something amounts to “misconduct” or “serious misconduct” depends on the nature and scope of the conduct undertaken. Including risking the viability or profitability of a university in the items that constitute misconduct could lead to a chilling effect on academic freedom. In free speech theory, a chilling effect occurs when people self-censor for fear of being accused of doing something wrong. University reactions It is unclear why these two universities have tried to impose these new restrictions on academics’ public commentary. It could possibly be a response to the recent controversy over academic Roz Ward, who was suspended from her position at La Trobe University and investigated for serious misconduct for comments on Facebook. During the raising of a rainbow flag over the Victorian parliament on a day on which the Premier Daniel Andrews apologised for past laws criminalising homosexuality, Ward wrote: “Now we just need to get rid of the racist Australian flag on top of state parliament and get a red one up there and my work is done.” Her criticism of the Australian flag as representing Indigenous dispossession is not new, or even particularly controversial, and the likelihood of her being able to replace it with a red flag symbolising her Marxist views is marginal at best. The university quickly changed its mind and reinstated her. But the attempt to punish her for expressing political views was widely seen as an overreaction by the university management, especially in the context of the controversy over the Safe Schools Campaign, of which she is a co-founder. The campaign provided materials for schools designed to combat prejudice against same-sex attracted, gender-diverse and intersex students. A number of conservative politicians had attacked the programme as providing inappropriate content to school children. Protecting freedom of speech Academics are often asked to comment on matters of public debate both within their specialised expertise and on general matters of interest. It should be up to the academic concerned to determine whether they feel qualified to comment on an issue or not. Engagement in public debate is vital if academics are to have an impact on society, improve public policy, and enable the development of new solutions to complex problems. Last year the federal government placed greater importance on research impact and engagement. It said universities needed to build stronger relationships with business and the community to ensure their research was having an impact on society. The kinds of restrictions reportedly being suggested by some university managements run counter to this mandate to improve the interaction between the academic pursuit of knowledge and social impact. Academics need to retain their freedom to speak on matters of interest, which intersect with their specialised knowledge, even where that intersection is tangential or not visible to others. They need to be able to speak out on matters of public concern without fear that they might be perceived to be placing the viability or profitability of their university at risk. Academic freedom is the key legitimating concept of the entire university system.

#### Industry sponsors

<https://blog.oup.com/2014/08/industry-sponsorship-academic-research/>

#### General academic freedom stuff

<http://www.aft.org/sites/default/files/academicfreedomstatement0907.pdf>

#### Cuba/Iran restrictions

<https://www.cooley.com/news/insight/2016/2016-02-16-restrictions-remain-on-certain-academic-and-research-activities-for-cuba-and-iran>

#### stuff about free speech

http://jnslp.com/wp-content/uploads/2010/08/06\_JACOBS\_REPLACEMENT\_PAGES.pdf

#### contracts

http://www.mercurynews.com/2008/07/29/top-schools-choosing-academic-freedom-over-government-research-restrictions/

### Semiconductors

#### more ev – fundamental research key

https://books.google.com/books?id=lhCgBQAAQBAJ&pg=PA162&lpg=PA162&dq=semiconductor+technology+public+university+research&source=bl&ots=e4tRgk7SL5&sig=bDWL1YNcTikkYkZoHEeJdljI0XM&hl=en&sa=X&ved=0ahUKEwjP1NCQ14jSAhUW7WMKHdcPCCkQ6AEISTAH#v=onepage&q=semiconductor%20technology%20public%20university%20research&f=false

#### Weak semiconductor technology undermines military effectiveness.

**Lieberman**, 6/5/**2003** (Joe – US Senator, The National Security Aspects of the Global Migration of the U.S. Semiconductor Industry, p. http://www.fas.org/irp/congress/2003\_cr/s060503.html)

The Pentagon's Advisory Group on Electron Devices (AGED) has warned that the Department of Defense (DoD) faces shrinking advantages across all technology areas due to the rapid decline of the U.S. semiconductor industry, and that the off-shore movement of intellectual capital and industrial capability, particularly in microelectronics, has impacted the ability of the U.S. to research and produce the best technologies and products for the nation and the war-fighter. This global migration has also been discussed in a recently released National Research Council/National Academy of Sciences report on the U.S. semiconductor industry, which details the significant growth in foreign programs that support national and regional semiconductor industries. This support is fueling the structural changes in the global industry, and encouraging a shift of U.S. industry abroad. critical national security applications Studies have shown that numerous advanced defense applications now under consideration will require high-end components with performance levels beyond that which is currently available. These cutting-edge devices will be required for critical defense capabilities in areas such as synthetic aperture radar, electronic warfare, and image compression and processing. Defense needs in the near future will also be focused on very high performance for missile guidance ("fire and forget"), signal processing, and radiation-hardened chips to withstand the extreme environments of space-based communications and tactical environments. There are profound needs for much more advanced onboard processing capabilities for unmanned aerial vehicles undertaking both reconnaissance and attack missions, for cruise missiles and ballistic missile defense, and for [[Page S7469]] the infrastructure that connects these systems. As the military transforms to a "network-centric" force in the future, the DoD's Global Information Grid will demand extremely high-performance computation to overcome the technical barriers to a seamless communication network between terrestrial 24 and 48 color optical fiber and satellite platforms transmitting in 100+Mbps wireless. Such performance will also be necessary for "last-mile" extremely high-speed connectivity to platforms and to the soldier in the field, as well as for the high-speed encryption requirements for a secure communication system. Intelligence agencies will increasingly need the most advanced chips for very high-speed signal processing and data analysis, for real-time data evaluation, for sensor input and analysis, and for encryption and decryption. As studies for DARPA have indicated, the next several generations of integrated circuits, which emerge at roughly eighteen-month intervals as predicted by Moore's Law, offer the potential for exponential gains in defense war-fighting capability. It is erroneous to believe that future U.S. war fighting capability will be derived from chips one or two generations behind current state-of-the-art technology. Many of the integrated circuits and processing platforms that are coming in to use, and which are at the heart of DoD defense strategies, are clearly at the cutting edge in their capabilities. With the dramatic new capabilities enabled by rapidly evolving chip technologies, DoD and the intelligence agencies will need to be first adopters of the most advanced integrated circuits, and will be increasingly dependent on such chips for a defense and intelligence edge. If the ongoing migration of the chip manufacturing sector continues to East Asia, DoD and our intelligence services will lose both first access and assured access to secure advanced chip making capability, at the same time that these components are becoming a crucial defense technology advantage. Informed elements of the intelligence community therefore have made clear that relying on integrated circuits fabricated outside the U.S. (e.g. in China, Taiwan and Singapore) is not an acceptable national security option.

### Advanced Materials Research

#### Advanced materials is key to scaling up graphene production for use in electronics – basic academic research is key

Probst 15 [(Laurent Probst, Laurent Frideres, Bertrand Pedersen & Steven Clarke) “The Graphene Revolution” Business Innovation Observatory, September] AT

Advancements in technology are an important driver of disruptive innovation and economic growth, and the recent isolation of a new two dimensional carbon-based honeycomb lattice product called graphene has generated enormous interest and media hype. Research suggests that this newly discovered material is the strongest, most impermeable and conductive material known to man. These unique properties have immediate market applications by incorporating it into existing products to enhance their strength, electric or thermal conductivity. But it is also hoped that research in the nanomaterial will help revolutionise fields such as electronics, energy storage, lightweight composite materials, or even biotechnology and medicine. Graphene's incredible potential might help it to become to the 21st century, what plastics were to the 20th. Today, graphene's development is still more focussed on research and development, along with product development. Graphene will become increasingly used as a component, and then eventually progress towards being incorporated into entire systems further down the line. But with time market focus will shift from research towards industry. An overall EUR 2.2 billion has been so far invested into research efforts and 7,740 patents filed between 2008 and 2012, and today the annual market for graphene in R&D and in product development is estimated at around EUR 12.7 million1. The companies presented in this case study are successful on the market thanks to their early capitalising on the discovery of this new material. They cater, or have catered at one time, to the needs of research and partnered with industrial players to incorporate graphene into existing products, or to help to develop new ones. Some companies focus on the synthesis of pristine graphene to be provided to clients early along the value chain. Some produce their own graphene-based product as a result of their expertise in graphene synthesis, while others aim to complement their graphene synthesis by providing advisory services on incorporation of graphene throughout the value chain. The graphene market is currently driven by a large amount of visibility and hype. This has helped support investment, and to keep up with ever increasing demand for energy, which is due to a rising need for energy storage and release. The technology is however not yet fully mature, and so there is much more research required before graphene can be mass produced. Ultimately the potential of the technology to impact so many different markets limits any particular focus, diluting market uptake. Several policies could be enacted in order to support this trend in Europe. First, specific solutions should be sought to facilitate compliance with the REACH Regulation. Second, standards could be established for graphene as a material, along with accepted health and safety guidelines and procedures for life cycle analyses. Third, access to research facilities and infrastructure could also be made easier for innovative SMEs. Fourth, coordination initiatives between different public support programmes at the national or regional level could be better supported. Finally and crucially, investment into fundamental research in nanomaterials should continue as it provides the basis for the future graphene revolution. Technological advancements in the production and quality of basic materials are a well-known driver of disruptive innovation and growth, particularly new advanced materials. Developments in the material sciences offer new growth prospects arising from new industrial and commercial products and processes. Within the context of this trend, this case study will present the potential for growth arising from the recently discovered material called graphene. Graphene is a two-dimensional, atomic-scale honeycomb lattice formed solely of carbon atoms where one atom forms every vertex (Figure 1). This single-atom thick, but indefinitely wide, aromatic molecule was first isolated and studied in laboratory conditions in 2003 by Geim and Novoselov2. Graphene is considered to be the strongest, most impermeable and conductive material known to man and is widely being touted as the material that will become to the 21st century, what plastics were to the 20th. Figure 1: Graphical representation of the molecular structure of a single layer of graphene Source: Graphene Flagship3 This newly discovered material has garnered huge interest because of its multiple unique properties. To begin with, research has shown that graphene is a very strong conductor of electricity. The electronic mobility of graphene is very high, albeit this is dictated by the quality of the graphene and the substrate. It has ten times the conductivity of copper and aluminium and an electrical resistance 35% smaller than copper4. Additionally, as a result of its molecular structure and the bonding arrangements between the carbon atoms, graphene is the strongest material ever discovered. It benefits from an ultimate tensile strength of 130x109 Pascals and is stronger than Aramid (the material used in Kevlar) or A36 structural steel5. Despite being a single atom thick, graphene has the surprising ability of having a high opacity, being capable of absorbing a large amount of white light. Thisgives it potential applications in photovoltaics for example. Adding more layers of graphene steadily increases this opacity6. Graphene has a huge variety of potential market applications. Its electronic conductivity properties makes it ideal as a component in electrical circuitry and it could be used to create ultra-fast electronic transistors, foldable touch screen displays (Figure 2) and light-emitting diodes as well as help increase the efficiency of batteries. Its optical properties give it the potential to have applications in photovoltaic cells, while the material’s mechanical properties have garnered interest of the aviation industry given its potential to both strengthen and reduce the weight of aircraft wings. The technology also has the potential to revolutionise the health sector e.g. tissue engineering or drug delivery. Figure 2: Graphene-based bendable touch screens Source: Nature7 The graphene market is still in its nascent stage and heavily R&D oriented. Recently, the European Research Council (ERC) granted EUR 1 billion investment for the Future and Emerging Technologies (FET) Graphene Flagship project, the largest-ever research initiative in the history of the EU. There are still several challenges to overcome before large- scale manufacturing of graphene can be achieved. While at the moment most companies involved in the technology are more focussed on R&D, the material stands to become prevalent in industrial applications once mass-produced graphene achieves the same level of performance as samples obtained in research laboratories. Some companies have already started to offer cost effective means to produce graphene, while others are even offering graphene-based components, while some have developed graphene-integrated products. The graphene revolution 3 Advanced Materials Figure 3: European roadmap for graphene science and technology Source: Graphene Flagship Roadmap8 Given that the technology readiness level of graphene is still relatively low and the market is in its early stages according to the technology roadmap (Figure 3), the majority of the companies in the graphene market cater to the academic field, with an objective of catering towards industrial clients as the market develops.

#### Graphene tech shift solves rare earth shortage – rare earth conflict causes structural violence and extinction

Sebastian Anthony 11 [(Sebastian Anthony) Rare earth crisis: Innovate, or be crushed by China, ExtremeTech 12-30-2011] AT

Many rare earths are also geochemically rare — they can only be mined in a handful of countries. This is simply down to Mother Nature being a tempestuous so-and-so: Some countries have deposits of rare earths, and some don’t. This results in massively skewed production (China famously produces 97% of the world’s rare earth metals), and, as you can imagine, a lot of national security and geopolitical troubles, too. Rare earth elements, in the Periodic TableIt doesn’t stop with rare earths, either: Many other important elements, such as platinum, are only available from one or two mines in the entire world. If South Africa sustained a huge earthquake — or was on the receiving end of a thermonuclear bomb, perhaps — the world’s supply of platinum would literally dry up over night. The continued existence of technologies that rely on platinum, like car exhaust catalytic converters and fuel cells, would be unlikely. If geochemistry and politics weren’t enough, though, we even have to factor in ethical concerns: Just like blood/conflict diamonds — diamonds that originate from war-torn African nations, where forced labor is used and the proceeds go towards buying more weapons for the warlord — some rare metals could be considered “blood metals.” Tantalum, an element that’s used to make the capacitors found in almost every modern computer, is extracted from coltan — and the world’s second largest producer of coltan is the Democratic Republic of the Congo, the home of the bloodiest wars since World War II. Not only do the proceeds from coltan exports get spent on weapons, but the main focus of the wars were the stretches of land rich in diamonds and coltan. Also along the same humanist vein, it’s important to note that extracting these rare elements is usually a very expensive and disruptive activity. Indium, probably the single most important element for the manufacture of LCDs and touchscreens, is recovered in minute quantities as a byproduct of zinc extraction. You can’t just set up an indium plant; you have to produce zinc in huge quantities, find buyers and arrange transport for that zinc, and then go to town on producing indium. In short, extracting rare elements is generally a very intensive task that is likely to disrupt or destroy existing settlements and businesses. The doomsday event that everyone is praying will never come to pass, but which every Western nation is currently planning for, is the eventual cut-off of Chinese rare earth exports. Last year, 97% of the world’s rare earth metals were produced in China — but over the last few years, the Chinese government has been shutting down mines, ostensibly to save what resources it has, and also reducing the amount of rare earth that can be exported. Last year, China produced some 130,000 tons of rare earths, but export restrictions meant that only 35,000 tons were sent to other countries. As a result, demand outside China now outstrips supply by some 40,000 tons per year, and — as expected — many countries are now stockpiling the reserves that they have. China owns the world's rare earth deposits Almost every Western country is now digging around in their backyard for rare earth-rich mud and sand, but it’ll probably be too little too late — and anyway, due to geochemistry, there’s no guarantee that explorers and assayers will find what they’re looking for. The price of rare earths are already going up, and so are the non-Chinese-made gadgets and gizmos that use them. Exacerbating the issue yet further, as technology grows more advanced, our reliance on the strange and magical properties of rare earths increases — and China, with the world’s largest workforce and a fire hose of rare earths, is perfectly poised to become the only real producer of solar power photovoltaic cells, computer chips, and more. In short, China has the world by the short hairs, and when combined with a hotting-up cyber front, it’s not hard to see how this situation might devolve into World War III. The alternate, ecological point of view, is that we’re simply living beyond the planet’s means. Either way, strategic and logistic planning to make the most of scarce metals and minerals is now one of the most important tasks that face governments and corporations. Even if large rare earth deposits are found soon, or we start recycling our gadgets in a big way, the only real solution is to somehow lessen our reliance on a finite resource. Just like oil and energy, this will probably require drastic technological leaps. Instead of reducing the amount of tantalum used in capacitors, or indium in LCD displays, we will probably have to discover completely different ways of storing energy or displaying images. My money’s on graphene.

#### And it leads to quantum computing

Wang 16 [(Brian Wang, ) Graphene Quantum Dots in Quantum Computing, No Publication 8-29-2016] AT

“Artificial atoms open up new, exciting possibilities, because we can directly tune their properties”, says Professor Joachim Burgdörfer (TU Wien, Vienna). In semiconductor materials such as gallium arsenide, trapping electrons in tiny confinements has already been shown to be possible. These structures are often referred to as “quantum dots”. Just like in an atom, where the electrons can only circle the nucleus on certain orbits, electrons in these quantum dots are forced into discrete quantum states. Even more interesting possibilities are opened up by using graphene, a material consisting of a single layer of carbon atoms, which has attracted a lot of attention in the last few years. “In most materials, electrons may occupy two different quantum states at a given energy. The high symmetry of the graphene lattice allows for four different quantum states. This opens up new pathways for quantum information processing and storage” explains Florian Libisch from TU Wien. However, creating well-controlled artificial atoms in graphene turned out to be extremely challenging. Cutting edge is not enough There are different ways of creating artificial atoms: The simplest one is putting electrons into tiny flakes, cut out of a thin layer of the material. While this works for graphene, the symmetry of the material is broken by the edges of the flake which can never be perfectly smooth. Consequently, the special four-fold multiplicity of states in graphene is reduced to the conventional two-fold one. Therefore, different ways had to be found: It is not necessary to use small graphene flakes to capture electrons. Using clever combinations of electrical and magnetic fields is a much better option. With the tip of a scanning tunnelling microscope, an electric field can be applied locally. That way, a tiny region is created within the graphene surface, in which low energy electrons can be trapped. At the same time, the electrons are forced into tiny circular orbits by applying a magnetic field. “If we would only use an electric field, quantum effects allow the electrons to quickly leave the trap” explains Libisch. The artificial atoms were measured at the RWTH Aachen by Nils Freitag and Peter Nemes-Incze in the group of Professor Markus Morgenstern. Simulations and theoretical models were developed at TU Wien (Vienna) by Larisa Chizhova, Florian Libisch and Joachim Burgdörfer. The exceptionally clean graphene sample came from the team around Andre Geim and Kostya Novoselov from Manchester (GB) – these two researchers were awarded the Nobel Prize in 2010 for creating graphene sheets for the first time. The new artificial atoms now open up new possibilities for many quantum technological experiments: “Four localized electron states with the same energy allow for switching between different quantum states to store information”, says Joachim Burgdörfer. The electrons can preserve arbitrary superpositions for a long time, ideal properties for quantum computers. In addition, the new method has the big advantage of scalability: it should be possible to fit many such artificial atoms on a small chip in order to use them for quantum information applications.

#### That solves all disease

Sergei Kouzmine 13 [(Sergei Kouzmine, Managing Partner of QWave Capital, a fund investing in quantum technology and other SciTech innovation. Sergei has more than 20 years of entrepreneurial experience, including his founding of Nonolet, a Russian PC manufacturer and distributor, where he introduced one of the first Russian computer brands. Prior to entering the business world, Sergei was a nuclear physicist) 4 Ways That Quantum Technology Could Transform Health Care, Co.Exist 9-4-2013] AT

In July, the International Conference on Quantum Technologies brought together the leading minds in physics to discuss the latest advances in quantum technology. Throughout the course of the conference, presenters demonstrated cutting-edge research with implications for everything from data security to IT to energy. There’s one industry, however, that is especially poised for massive changes on many levels from quantum technology: health care. Quantum technology is set to revolutionize the way we think about health care, medical data, and even our own biology. Why does quantum technology hold so much promise for health care? In part, it’s because many cell processes take place at the nanoscale—the world of atoms and subatomic particles. When you get down to the nanoscale, matter stops behaving according to the laws of classical physics and starts demonstrating the unique (and often counter-intuitive) properties of quantum mechanics. Using the properties of quantum mechanics, scientists are building tools that are both ultra-precise and ultra-personalized. Using the unusual properties of quantum mechanics, the scientists at the conference (and others from around the world) are building medical tools, diagnostics, and treatments that are both ultra-precise and ultra-personalized—tools that will ultimately prolong and improve our lives. Here are just a few of the most promising breakthroughs on the horizon. 1: IMPROVED DISEASE SCREENING AND TREATMENT Using a relatively new method known as the bio-barcode assay, scientists can now detect disease-specific clues, or "biomarkers," in our blood using gold nanoparticles, which are visible using MRI technology and have unique quantum properties that allow them to attach to disease-fighting cells. These gold nanoparticles are completely safe for human use. This method is also cheaper, more flexible, and more accurate than conventional alternatives. Mikhail Lukin, a physics professor at Harvard and expert in quantum optics and atomic physics, is also working on manipulating nanoscale particles of diamond for similar purposes. He hopes to eventually use diamond particles, which are non-toxic, to take images of human cells from the inside and detect disease without exposing patients to radiation. A novel type of quantum-based MRI could be used to look at single molecules. Quantum sensors can also improve the MRI machine itself by allowing for ultra-precise measurements. A novel type of quantum-based MRI could be used to look at single molecules or groups of molecules instead of the entire body, giving doctors a far more accurate picture. Hypres is an example of a company that is working to retrofit MRI machines to be more sensitive—and to work faster—by harnessing the supercurrent phenomenon known as the Josephson effect. Other quantum-based techniques are also being developed to treat diseases. For example, gold nanoparticles can be "programmed" to build up only in tumor cells, allowing for precise imaging as well as laser destruction of the tumor, without harming healthy cells. 2: NO MORE NEEDLES Researchers at the University of York have designed a patch that can be applied to skin in order to deliver targeted therapies sans hypodermic needles. The patch, called Nanject, will be used to deliver cancer drugs without harming healthy cells. Here's how it works: The nanoparticles are coated in antigens (substances that bind to antibodies) before being introduced to the body, where they attach to cancer cells. Afterwards, the patient is treated in an MRI machine that triggers the particles to heat up and destroy the cancer cells. When the machine is turned off, the particles cool back down and can be removed from the body without any harm to the patient. EDITOR'S NOTE Here's another needle-less project we wrote about recently: a patch that is giving you a constant blood test. Needle-phobic patients may also be thrilled about this kind of advancement: the Nanject patch replaces a single syringe with many tiny ones made of polymer nanofilaments that deliver the medication through hair follicles. However, there’s another, perhaps more important, benefit to the nanotech drug-delivery route: It removes some of the toughest barriers to distributing medication, particularly in remote and impoverished areas. With a patch, there is no need for a trained nurse or doctor to inject medication; it be self-administered by anyone through a process that's as simple as sticking on a band-aid. Nanotech drug delivery also allows for lower doses, since the nanoparticles aren’t eaten up by stomach acid like pill-based medications. Finally, treatments like the Nanject can help prevent the spread of disease via unsterilized needles—a major problem in developing nations. 3: HACKING HUMAN BIOLOGY Beyond improved disease screening and highly targeted, needle-free treatments, quantum mechanics holds the potential to provide us with more information about human biology. Using quantum computers, we can more quickly sequence DNA and solve other Big Data problems in health care. Australian scientists recently discovered a way to explore the inner workings of a living cell using a novel type of laser microscopy that is built on the principles of quantum mechanics. And using quantum computers, we can more quickly sequence DNA and solve other Big Data problems in health care. This opens up the possibility of personalized medicine based on individuals’ unique genetic makeup. 4: MORE SECURE HEALTH DATA People want to protect their health data for obvious reasons, so it's important to consider all the ways that it can be hacked. In the future, for example, it may become possible for hackers to retroactively intercept communications. One of the quantum conference attendees, Nicolas Gisin, works with ID Quantique, a company that is using the strange quirks of quantum phenomena to protect our data in an ultra-secure fashion. Using quantum entanglement in one of the most practical applications of the phenomenon to date, quantum cryptography prevents data from being viewed by anyone other than the intended recipient. ID Quantique already provides security to banks and governments and ultimately sees strong potential in the health care industry. Innovations built on the principles of quantum mechanics hold the potential to affect health care on nearly every level, from diagnosis and treatment to data storage and transmission. We need to keep a close eye on quantum technology and health care—an area that will benefit from increased funding for research and product development. We’re on the cusp of some thrilling advancements, and we should all educate ourselves on how quantum technology will transform health care in the not-so-distant future.

## Cuts

### Winograd

#### Anti-war sentiment on campuses decreases military funding for research at colleges

Winograd 87 [Terry Winograd (CS professor at Stanford), "Strategic Computing Research and the Universities," 1987] AZ

Finally, more subtle but potentially more dangerous is the effect of military funding on the open political activity of students and faculty within the universities. University administrators know that an atmosphere of student antimilitary activism may well lead military sponsors to fear the disruption of research activities, or at least to see the university as a less congenial environment for the research. Although direct pressure is rarely applied against student activities, it would be naive to think that university administrators were immune to such important financial considerations. At the individual faculty level, such pressure has been more overt. In his Senate confirmation hearings in 1985, Undersecretary of Defense Donald Hicks (the head of research for the Pentagon) sharply criticized opponents of the Strategic Defense Initiative and stated: “I am not particularly interested in seeing department money going someplace where an individual is outspoken in his rejection of department aims, even for basic research.” Hicks was later quoted in Science as saying, “Those who want to accept the money to help us with programs we need, we want to have. But I don’t particularly view it as appropriate when somebody says we don’t like the way you’re running the department, but we sure like your money.” He said later that he was principally upset by computer scientists who depend in part on DOD support, but voice skepticism about the feasibility of the software demanded by a comprehensive missile defense. “If they want to get out and use their roles as professors to make statements, that’s fine, it’s a free country,” Hicks said. “But freedom works both ways. They’re free to keep their mouths shut...[and] I’m also free not to give them money. . . I have a tough time with disloyalty.“‘9

#### Pentagon contracts kill long-term research

* military funding shifts focus to a few departments
* trades off with other research
* decreases overall number of researchers bc just a few schools get money

Winograd 87 [Terry Winograd (CS professor at Stanford), "Strategic Computing Research and the Universities," 1987] AZ

The university is much more than a producer of specific research results. As the center of higher education, what goes on there shapes the society in direct and subtle ways. Military funding affects the balance of activities and priorities within the university in a way that can have a deep impact outside specific research areas. Within a scientific discipline, it can distort the distribution of funds, people, and educational opportunities. A number of prominent university leaders have raised this issue in conjunction with the SDI. President Donald Kennedy of Stanford said that SDI funding “throws the balance of science research all out of whack.” Marvin L. Goldberger, president of the California Institute of Technology, held that “the infusion of such a large amount of money can distort activities within the university. It can draw people into research areas they might not otherwise pursue. “10 Similar objections have been raised about the effect of projects such as the SC1 on computer science research. The DOD-University Research Instrumentation Program (FY 1984/85) offered $150 million to universities to “acquire research equipment a t universities to address DOD basic research needs,” stating: The goal of this program is to improve the capability of universities to perform research in support of national defense. Specifically, it is a program to provide funding for the acquisition of research equipment at universities for the stimulation and support of basic research which supports the technology goals of the Department of Defense.... Instrumentation requested must be for use in research in areas of priority concern to the military services.11 In a separate program, called the University Research Initiative Program, DOD states: The... programs are designed to increase the number of science and engineering graduate students; to increase the investment in major pieces of research equipment at universities; to increase the investment in higher risk basic scientific research in support of critical Navy and DOD technologies; and to provide more opportunities for contacts between universities, industry, and Navy and other DOD laboratories.12 These program goals are broader than specific military applications. They are part of a larger pattern of the past few years, in which for the first time since the Vietnam War, the DOD is proposing to fund a variety of programs designed more to enhance the health of the universities than to meet short-term defense needs. But the political significance of the new initiative is that it sends a strong message that the Pentagon now considers broad support of university programs a legitimate part of its mission. As in the past, research-justified equipment will end up playing a large role in the university, beyond the specific research projects. It is commonplace for such equipment to be used unofficially for a wide variety of academic and instructional purposes, and in many cases such sources are the only way to fund new general-use facilities. The net effect will be to strengthen certain departments (those that “support the technology goals of the Department of Defense”) at the expense of others. Those that bring in new equipment will be in a better position to acquire new faculty slots, to attract bright students, and in general to compete in the world of academic resources. One obvious impact is the further strengthening of the “hard sciences” and engineering (including computer science), at the expense of the social sciences and humanities. Another is an increase in the advantage of the elite universities (the grants come in chunks of up to $20 million). In fact, the creation of this advantage has been a significant effect of military computer science funding in general over the last thirty years. It has resulted in a highly unequal situation in which a few schools have received almost all the resources. Although this may have led to more effective research in the short run, it has also been a factor contributing to the significant long-term shortage of trained computer researchers.

#### Wide-scale resistance to military funding works

Winograd 87 [Terry Winograd (CS professor at Stanford), "Strategic Computing Research and the Universities," appeared in *Strategic Computing: Defense Research and High Technology*, 1987] AZ

The most direct action that individual researchers or institutions take is to refuse military funding (either in general, from particular sources, or for particular projects). Many universities have a policy of refusing classified research, and some research institutes do not, on principle, accept funding for applied military research, although they will accept it for what they consider basic research. There are individuals, including myself and Professor Joseph Weizenbaum of MIT24, who reject all military funding. For the reasons discussed above, the cost of refusing funding (to both the individual researcher and his or her institution) can be high, and often it is not feasible without dropping out of the research area altogether. In many cases there are no alternate sources of support, and in others nonmilitary sources cannot provide the amount or kind of resources necessary. In order to make this strategy a viable alternative, pressure needs to be brought to bear on a larger scale-to change the overall pattern of how government research spending is managed. As a step in this direction, criticism of military research funding has been taken up by larger groups. The Stanford SWOPSI report, mentioned above, was an attempt by a group of students and faculty to raise the issue of research funding on a larger scale and to affect public opinion. More recently, there has been a growing campaign among researchers around the country (and the world) seeking pledges that they will not accept SDI funding. As of summer 1986, over 3,800 university faculty members (mostly in physics and computer science) had signed this pledge, representing majorities in 110 research departments. They are concerned with the direct effects of the funding on campus (especially the skewing of research priorities and the potential for imposition of secrecy) and also with opposing the SDI project on the grounds that it is not feasible or effective in increasing national security. In the case of the Strategic Defense Initiative, this refusal has had a visible impact on the program. In discussing the decision by many scientists not to work on SDI research, Lt. Col. David Audley (head of the battle management and command, control, and communications program for the SDI) told of some code used in an astronomy project that “had just what we needed, but the guy who owned the code restricted it so it couldn’t be applied for SDI... It hurts. We need all the talent that we have.“25 Other groups have taken public education about military research goals as a primary activity. For example, Computer Professionals for Social Responsibility has issued informational papers on several issues, including the SC1 and the SDI.26It has also worked with universities to sponsor public debates on the technical merits of the SDI, in order to give the public a more balanced view in which computer science experts argue both sides. As an organization of computer professionals, CPSR provides expert testimony to counteract the “enlistment” through funding of university scientists into the debate over projects and strategies. Those of us doing computer science research in the universities must acknowledge the fact that computer technology plays a major role in modern military development. We have the obligation to ourselves and to our students to seriously examine the consequences of our actions, in all of the domains I have discussed, and to make informed and responsible decisions about our work and the ways in which it is supported.

### Carlson

#### tag

Carlson [Scholars and Secrecy--Classified Research Comes Under Criticism,"] AZ

Universities in growing numbers are spurning Government contracts that call. for secret research. Mounting opposition, by both professors and students, to the Vietnam war and to war-related research is spurring the trend. But just as significant is increasing faculty concern that classified contracts may curtail a scholar's traditional obligation to disseminate his research findings. The upshot: Some universities are scaling down or canceling such research projects. And at a number of other schools around the country heated debate is under way. The University of Pennsylvania this spring. canceled two classified Defense Department contracts for assessing the effectiveness of chemical-biological warfare. Administrators abandoned the $1 million projects-known as Spicerack and Summit-after a two-year campus dispute that reached its climax when some professors threatened to wear gas masks at commencement exercises. Stanford University, New York University and the University of Minnesota are tightening restrictions governing acceptance of classified research contracts from Federal agencies. Some secret projects at these schools have already been phased out. Faculty committees at Johns Hopkins University, the University of Pittsburgh and the University of California's Berkeley campus are currently taking a new look at secret research. Debate at Michigan And just last week debate erupted at the University of Michigan when the Michigan Daily, the student newspaper, disclosed the existence of about $9 million in classified Defense Department projects at the school. The contracts range from counterinsurgency projects in Thailand to research on a new intercontinental ballistic missile. The controversy probably will prompt reassessment of university policy, observers say. "Schools are starting to cut back on classified research, and they will continue to do so," says Jay Orear, chairman of the executive committee of the Federation of American Scientists, a professional group of 2,000 researchers on and off campus. After polling some 300 colleges and universities this summer, the federation found that "a good many" schools that previously had no policy covering secret contracts were beginning to restrict such research, Mr. Orear says. In August, the federation urged universities not to "accept funds that impose restrictions on the publication of research findings." Worried that such contracts may be getting out of hand, other academic groups have taken similar positions. Early this year the American Anthropological Association, a professional group, came out against classified research. And earlier this fall the American Association of University Professors set up a committee to study the matter. Amount of Classified Research In dollar terms, the total of classified research contracts is relatively small. During the 1967 Federal fiscal year, universities received Defense Department research and development contracts totaling $290 million, of which only about $34 million involved classified projects, according to an official of the department's Office of Defense Research and Engineering. (The Defense Department provides the bulk of classified contracts, although some come from other agencies like the National Aeronautics and Space Administration and the Atomic Energy Commission.) Nonetheless, the Pentagon official asserts "it would be adverse to the national interest" should more schools cancel classified grants. "At the University of Pennsylvania we lost a very experienced research source," he explains. "It might be a year before we start getting the same quality work from another contractor." The work at Penn was transferred to the research subsidiary of Booz, Allen & Hamilton Inc., a Chicago-based management consultant firm. Some university defense contracts have been so secret that even the school's president has known little about their nature. Last month, for example, a University of Minnesota vice president urged the regents and newly selected President Malcolm Moos, a political scientist who served as a speech-writer for President Eisenhower, to approve a classified contract with the Pentagon even though details of the contract couldn't be revealed. The regents and Mr. Moos knew next to nothing about the project, though a newspaper story subsequently disclosed it was concerned with methods of prisoner-of-war interrogation. A New Policy "We were asked to approve it 'on faith,'" recalls Mr. Moos, who strongly objected to the project. "Unless we were on the verge of World War III, I don't think I'd favor secret research at a university." While the regents approved the project over Mr. Moos' objection, the Air Force soon withdrew it, purportedly because of lack of funds. Mr. Moos says that later this month he will propose to regents a new research policy that would "make highly unlikely a recurrence" of the September episode. Those opposed to secret research agree that anti-Vietnam feeling has brought the controversy to a head. But there are more basic causes. "A university should be an open community of scholars devoted to advancing knowledge," says Gabriel Kolko, associate professor of history at Penn, who fought projects Spicerack and Summit. "The Defense Department likes universities because they do high class work very inexpensively. So, in effect, the very nature of the schools is being compromised to save the Government some money," he says. Adds David LIsdy, chairmain of Pittsburgh's anthropology department: "I object to classified research because it often gives the sponsoring agency a censorship function. Findngs often can't be shared with colleagues who are unable or unwilling to get security clearance of their own." Pentagon officials reply that the classified label doesn't necessarily mean that the research can't be published. Projects are classified when researchers are given access to secret information, and findings may be published provided none of the secret information is disclosed. However, the sponsoring agency usually reserves the right of review prior to publication, the officials concede. Harvard and some other universities ban all classified research, although even Harvard allows individual scholars-to work on secret projects outside the university on a consulting basis. Many schools tend to discourage secret research but permit exceptions when the particular interests of their professors touch on areas related to national defense. Some schools, however, are making fewer exceptions than in the past. Last spring, after the Penn controversy, trustees of New York University, on the recommendation of a faculty committee, adopted a policy requiring that all classified projects have the "written approval" of the president. Prior to that move, approval of such contracts was left to individual department heads. A Contract Is Dropped Already the new policy has resulted in the scaling down of some secret research. NYU recently declined to renew a $44,000 Defense Department contract to evaluate chemical warfare weapons systems. "We discontinued the project after deciding it wasn't in line with the humanitarian purposes of a university," says John R. Ragazzini, dean of the school of engineering and science. To keep secret contracts at a minimum. Stanford University's faculty early this year inaugurated continuous, case-by-case review of new proposals for classified research. Says William F. Baxter, professor of law, who headed a group that recently proposed tougher restrictions on such research: "We want to head off the contracts that make you lie about the kind of research you're doing." He adds: "There have been cases where the Central Intelligence Agency has attempted to negotiate contracts here that would have made us deny the existence of the project." Faculty concern about secrecy has already prompted Stanford to refuse some Government contracts. The school recently declined an Agency for International Development (AID). contract to start a graduate program in physic at an Argentine university. The proposal caller, for two Stanford professors to set up the program while, in exchange, several Argentine students attended Stanford. AID wanted to review all research performed by participants, professors and students, with the right to bar publication if it chose. AID also wanted the right to demand recall of Stanford professors on the project if it chose to do so. "These terms simply were unacceptable," says a Stanford official. Despite such cases, some Federal agencies claim they're trying to ease contract restrictions. "We're attempting to eliminate some problems by expediting declassification where it's reasonable to do so," says a Pen- tagon spokesman. But a Stanford official says: "We're experiencing greater efforts by the Defense Department and other Federal agencies to insert 'right of review' provisions into research contracts that normally wouldn't be classified. This is sort of the back-door approach to classification."

### Brandt (2006)

Brandt 6 [Elizabeth Barker Brandt (Professor of Law, University of Idaho), "The Crumbling Academic Freedom Consensus and the Threat of U.S. Anti-terrorism Policy," Forum on Public Policy, Summer 2006] AZ

#### Academic freedom is in danger – counter-terrorism policy is the final straw that crushes independent research in American universities

Beginning with the bombings of the World Trade Centers in 1993, escalating with the Oklahoma City Bombing, and with the 9/11 World Trade Center bombings, the U.S. government has adopted steadily more intrusive policies and legislation aimed at the monitoring and apprehension of terrorists. The impact of this growing web of regulation has been felt by Americans in many of their daily activities. One aspect of the tightening U.S. security web that has not been examined in detail is its impact on academic freedom. Some of the new policies are directly aimed at higher education, other aspects of the policies have a disproportionate impact on higher education. Still other aspects of the policies affect academia only indirectly. Cumulatively U.S. antiterrorism policy has a significant impact on academic institutions restricting openness and limiting institutional autonomy in contravention of fundamental principles of academic freedom. On the eve of 9/11, academic freedom was already in fragile condition. The ongoing politicization of the humanities and social sciences and the increasing dependence of universities on external funding with commercial and ideological ties were already eroding free thought on campus and institutional autonomy. The additional strain of the war on terror caused by the use of universities as a weapon in the war, government interference with the ability of universities to attract and accept qualified students and continue existing research programs, and a chilling climate for academic work critical of the government, may spell the end of academic freedom as it has been conceived for the last hundred years in American colleges and universities. In this paper, I argue that academic freedom is secured not primarily by law but by a social compact. U.S. anti-terrorism policy, clumsily implemented with little regard for the academic costs, may be the proverbial straw that breaks the back of academic freedom. The politicization of the academy and the increasing dependence of college and universities on ideological and commercially based funding have weakened the compact substantially. Because academic freedom is the defining characteristic of a university in a free society, the idea of the university itself is in grave danger. Universities have been the source of much of the critical thinking on literature, science and policy questions in the United States.1 Because the university has traditionally been insulated from the pressures of public and political life, it has provided the distance necessary for reasoned reflection and critique. Universities have furnished a laboratory in which many students develop their own world view for the first time. This world view is shaped not only by reading, reflection discussion and debate, but by study with faculty who are themselves responsible for the expansion of knowledge in their fields of expertise. Universities have been able to fulfill this function largely because academic freedom, at least in theory, protects the autonomy of educational institutions free exchange of ideas within in them.2 Professor Reichard de George recently observed: In the former Soviet Union, the state prescribed what would be taught, what could be published and what research was allowed. The result was a passive citizenry and a stultified research program. It is not coincidental that academic freedom came into its own in Europe along with the emergence of political and religious freedom, the spread of democracy, the burgeoning of science and the articulation of a liberal approach to thought. They all go together as the intellectual authority of the state and or the church are replaced by the authority of reason, argument and evidence.2 ACADEMIC FREEDOM AND THE IDEA OF THE UNIVERSITY Academic freedom is a social compact. Its continued vitality is dependent not on law, but rather, on the willingness of those involved in the academic enterprise to adhere to its core ideas and the willingness of those outside the academic enterprise to refrain from undue interference3 While some aspects of academic freedom intersect the law of contracts and the protection of free speech, its core ideals do not find roots in legal soil. If academics (both administrators and faculty) lose track of their commitment to academic freedom, if they fail to explain and defend the concept to those outside the academic enterprise, or if those third parties no longer feel constrained to intervene in decisions of the academy, academic freedom as it has been understood will not survive. Higher Education will survive, but it will be fundamentally changed -- it will look more like private research entities, schools of vocational education, and ideological think tanks. Research and teaching agendas will be determined more directly by vocational needs and by political strategy, and will be controlled by market forces and politics. Our higher education system will resemble the stultified and passive system described by de George.

#### Industry ties harm credibility of researchers

The problem is that universities have become increasingly dependent on funded private research and ideological philanthropy as other sources of funding have dried up.87 Sponsored research may be funded either by industry or government funding – both raise concerns. With regard to industry-funded research, the AAUP has recently observed “[t]he relationship [between academia and industry] has never been free of concerns that the financial ties of researchers or their institutions to industry may exert improper pressure on the design and outcome of research. This is especially true of research that has as its goal commercially valuable innovations, which is the most common type of industry-sponsored research.”88 Statistics released by the National Science Foundation indicate that in 2001, industry provided 6.8 % of academic research and development funding, and that over the past three decades, industry funding for academic research has grown faster than any other source of research funding.89 In some fields, the increase in industry-funded research has been very substantial.90 The growth in corporate funding has also been associated with activities that fundamentally jeopardize the independence of such research. For example, the AAUP report details incidents involving conflict of interest, pressure to “cook” research data, attempts to suppress negative research results, and corporate influence over faculty appointments.91 In some fields it is common for academic researchers to have direct commercial interests in the subject of their research.92 As a result of the commercialization of academic research, researchers commonly enter into confidentiality and trade secrets agreements with industry sponsors that restrict their ability and the ability of their students and their educational institutions to disseminate the results of their research.93 These types of arrangements jeopardize scholarly exchange and openness.94 Many researchers receive personal gifts from the corporate sponsors of their research in exchange for special treatment such as prepublication review of articles or ownership of intellectual property resulting from the research.95 These arrangements give rise to the appearance of conflict of interest, and raise the specter of outside influence on research results. While concrete examples of how such conflicts have impacted scientific research are hard to come by, there are some recent high profile situations that provide a glimpse at the issues. For example, when a biomedical researcher at the University of Toronto moved to publish and inform patients of the negative results of a research project in which she was involved, the corporate sponsor discontinued the funding and threatened legal action. The University of Toronto, at which the researcher was a clinical faculty member without tenure, did not support her.96 Reports have also surfaced that tobacco companies funded research designed to cast doubt on studies documenting the negative public health effects of cigarette smoking and used “ties with the editor of a peer-reviewed scientific journal to have articles published without disclosing the authors’ or editor’s connections to the tobacco industry.”97

#### External funding strains academic freedom

Concerns with national security are leading the federal government to place limitations on dissemination of federally funded research.98 Industry funding is not the only concern. The increase in federally funded research is also an issue. One writer has pointed out that “these [federal] funds did not come without restrictions, ‘as government support . . . grew, government regulations affecting universities and research proliferated. While government regulations were primarily directed toward fiscal affairs – ensuring appropriate use of federal funds, recent regulations, laws, and investigations have begun to affect scientific matters.”99 Closely related to the growth in university dependence on external research funding is the increase in commercial support for the general operations of universities. Although, private philanthropy has always been a substantial source of university support, the nature of that private philanthropic support has changed; private donors are increasingly commercial entities or are deeply ideological. These donors are interested in using their leverage to secure influence over university decision-making that extends far beyond “naming” opportunities.100 Private foundations with an ideological agenda have given even larger amounts of money to universities to support research supportive of that agenda.101 Recent agreements have involved corporate sponsorship of an entire academic department102 The AAUP Statement on Corporate Funding of Academic Research reports several additional anecdotes.103 The insidious impact of external funding is hard to capture. Much of the influence of external funding is positive. It has lead to the democratization of the scientific professions,104 and an expansion of opportunities.105 Likewise, private funding has made scholarships available, subsidized the expansion of university operations, and expanded fields of inquiry.106 Funded research at academic institutions has lead to an explosion in the scope of basic knowledge and scientific discoveries particularly since World War II.107 Despite these positives, the growing dependence of universities is straining their independence and the autonomy of academic researchers.108 The economic productivity of academic programs is becoming one of the most important measures of legitimacy109 Professor Rebecca Eisenberg has identified three threats to academic freedom associated with funded research: secrecy of research results, distortion of the viewpoints and claims of academic researchers, and distortion of the academic research agenda.110 The providers of external funding inevitably influence the functioning oft a university. By conferring the benefit of control over external funding on individual faculty members, the balance of power in a university is redistributed – researchers gain independence, have loyalties to entities other than the university.111 This may be divisive – enabling some researchers to take advantage of benefits not available to others.112 Finally, public scandals regarding conflicts of interest can erode trust in academic institutions.113 The dependence of universities on external funding threatens to convert them into private research facilities – dependent upon producing results that advance the interests of external supporters.

#### Universities giving in to government pressure

A CRUMBLING CONSENSUS By 2001, the political polarization in the academy had altered by not dissipated and the dependence of universities upon external funding with ideological and commercial strings attached had only increased. Most universities were taking external funding with inappropriate strings attached while holding their institutional noses an hoping that the next scandal over funded research did not occur in their institutions. This approach has created a rift between the aspiration of academic freedom and the reality of research practices. Most universities were ignoring the political struggle that had moved outside their doors. This approach has resulted in the shifting of that struggle to an external attack on universities and faculty members that has percolated up in think tanks, Congress and state legislatures. This response of simply papering over or outlasting the debate has left a rift in the academic freedom compact. As understand or care about the aspirations. The consequences can be seen in a number of indicators. In a 2002 survey, 41% of the respondents said they favored restrictions on the academic freedom of professors to criticize government military during war. 22% strongly supported such restrictions.114 There appears to be little public will to support state universities – in fact the predominant state policy across the country appears to one of privatization.115

#### Gotta fight the power

U.S. antiterrorism policy had affected the operation of libraries – making patron records and librarians instruments of governmental investigations. It has limited the ability of universities to accept qualified international students, has subjected those students to long delays and to significant, ongoing inquiries into their status and academic progress. As a result both of its regressive policies and of their clumsy administration, the number of international students and scholars in the U.S. is declining, threatening the diversity, financial strength, and even the ongoing viability of university research programs. In the service of terrorism investigations, the privacy of all students’ educational records has been disrupted potentially undermining the relationship between schools and their students with little possible improvement in the effectiveness of terrorism investigations. Core academic speech and service activities are being chilled by overbroad interpretation of statutes criminalizing support for terrorism. And the way scientific research is conducted is be altered significantly, decreasing the dissemination of knowledge and the open exchange of ideas. All of this is taking place climate of low level but demonstrable intolerance for criticism of U.S. national security policy. Some have commented that the invasion of academic freedom in the aftermath of 9/11 has been surprisingly minor.258 Yet when the incursions on academic freedom are viewed as a who and in the context of the already weakened state of free thought and autonomy in the academy, the state of academic freedom appears dire. The academy cannot expect courts to provide a bulwark against further erosion. Rather, it is the responsibility of academy to rebuild the social compact that is academic freedom – to guard it internally, to defend it when appropriate, and to educate the world outside academia about what could be lost without it. Otherwise, de George’s prediction of a passive citizenry and a stultified academy is our future.

### AAUP (2003)

#### Export controls on research results violate free speech protections

AAUP 3 [American Association of University Professors, (Report of the AAUP Special Committee on Academic Freedom and National Security in a Time of Crisis), "Academic Freedom and National Security in a Time of Crisis," October 2003] AZ

A major section of the report is devoted to restrictions on information. It reviews the evolution of federal regulation of classified research and the persistent uncertainty about the extent and location of such research within the academic world. The report recognizes the limited circumstances under which such restrictions may be warranted but points out that secret research is fundamentally at odds with the free circulation of research results. The report expresses reservations about the expansion of such constraints in response to national security concerns. The report takes a similar view of federal laws that required the licensing of certain exports, including research results, long before September 11. It notes that federal courts have on five recent occasions invalidated on free-speech grounds the procedures used to deny export licenses for the international sharing of cryptography. Also of concern to the committee is the emphasis the federal government has recently placed on the elusive category of "sensitive but unclassified" information. The report describes the rationale for stricter scrutiny of certain types of information and the historical antecedents to the current debate, but it urges that the extent and nature of restraints on unclassified research, however sensitive, should remain chiefly the responsibility of the scientific community.

### COGR (2008)

COGR 8 [Council On Governmental Relations (COGR) & Association of American Universities (AAU), "Restrictions On Research Awards: Troublesome Clauses 2007/2008"] AZ

### terror DA

#### This speech is constitutionally protected, especially in a college setting – the AFF would allow for information exchange about “sensitive but unclassified” research

Jacobs 5 (Leslie Gielow Jacobs – Professor of Law at the University of the Pacific McGeorge School of Law, “A Troubling Equation in Contracts for Government Funded Scientific Research: “Sensitive But Unclassified” = Secret But Unconstitutional”, http://jnslp.com/wp-content/uploads/2010/08/06\_JACOBS\_REPLACEMENT\_PAGES.pdf, pgs. 155 – 156, EmmieeM)

The university plays a special role in preserving and promoting speech free of government influence. The Supreme Court has emphasized the role of the university as a “vital center[] for the Nation’s intellectual life” that should be free from “the chilling of individual thought and expression.”221 The Court has noted this special role of the university in the context of both created forums222 and other funding conditions.223 In Rust v. Sullivan, the Court explicitly cautioned that its decision upholding an abortion counseling restriction on family planning funds was “not to suggest that funding by the Government, even when coupled with the freedom of the fund recipients to speak outside the scope of the Government-funded project, is invariably sufficient to justify Government control over the content of expression.”224 The government’s imposition of SBU secrecy clauses raises additional constitutional concerns in the university setting. The government has broad power to keep its own information secret and to require its employees to keep that information secret. It can conduct scientific research intramurally, and it can exercise great control over dissemination of the resulting information. But the structure of such internal controls makes a difference under the Constitution, because it leaves the government politically accountable for its actions, at least to some degree. This consideration suggests that SBU secrecy controls that reach into university discourse pose a particular danger because of the special role of the university in promoting innovation and expression outside of government control, and because, with respect to scientific information in particular, the university has a special role in conducting research for the purpose of expansion and dissemination of knowledge. Although the government shapes expression on university campuses in many ways, the expectation is that expression not identified as the government’s will be unconstrained. The special role of the university thus must weigh in the constitutional balance.

#### The USFG is reliant on government-funded university research for national defense developments, but 9/11 and the Anthrax attacks proves those are vulnerable to terrorist cooption, absent censorship which violates the First Amendment.

Jacobs 5 (Leslie Gielow Jacobs – Professor of Law at the University of the Pacific McGeorge School of Law, “A Troubling Equation in Contracts for Government Funded Scientific Research: “Sensitive But Unclassified” = Secret But Unconstitutional”, http://jnslp.com/wp-content/uploads/2010/08/06\_JACOBS\_REPLACEMENT\_PAGES.pdf, pgs. 113 – 115, EmmieeM)

Breakthrough science can lead both to great good and to great evil. The September 11, 2001, terrorist attacks on the World Trade Center and the Pentagon and the anthrax letter attacks that followed highlight the fact that our enemies may use our own advanced science and technology against us. 1 When the dissemination of scientific information might jeopardize national security, the federal government's primary response has always been to try to control the spread of that information. In a variety of ways, the government has long restricted public access to scientific information in the government's possession. Since September 11, the government has further tightened access to its own information, withholding from public view not just classified data but also so-called "sensitive" information, the release of which it says could pose a danger to national security. Even with the new security precautions in place, however, the government fears that it cannot keep the nation safe if it is able to control only its own information. That is because some potentially dangerous scientific information is produced by scientists at universities and in industry. Yet the dissemination of privately funded, privately produced scientific information is a form of private speech protected by the Constitution, and the government's ability to restrict such speech, even when it might pose a danger to national security, is limited. The government cannot "classify" or otherwise prevent the sharing of such information without a court order, and rders of this sort are available only in the most extreme circumstances. 2 Between the extremes of private and government information sits information produced by private scientists with government funding. Contract clauses that restrict the ability of funded scientists to disseminate information related to government-sponsored research occupy an ambiguous middle ground in constitutional doctrine. Can the government restrict the flow of scientific information produced with government funding in the same way that it can control its own information, or do the constitutional limits that protect private speech apply? This question has become increasingly urgent in the wake of the terrorist attacks on September 11, 2001. Since that time, the government has sought to expand the secrecy it imposes on funded private research beyond "classified" information to include information that is merely "sensitive." Although contract clauses that restrict the release of classified information are an accepted part of the government/scientist research funding relationship, clauses to protect "sensitive but unclassified" (SBU) information are new. 3 The SBU secrecy clause currently in widest use requires prior written approval from the contracting agency before a scientist "release(sJ to anyone" in any form SBU information "pertaining" to the research contract. ~ The clause is aimed not only at information contained in a contract's work product that a scientist delivers to the government, however. It applies also to the scientist's other publications and communications, which may include or refer to work done with government funding, but which are separate and distinct from the contract "deliverable." These "releases" may include scholarly papers, conference presentations, email messages, and even telephone or laboratory conversations. What constitutes SBU information is not well understood, nor is it clear when particular information "pertains" to a research contract.5

#### Restrictions on this speech are crucial to prevent bioterror from modified viruses

Knezo 6 (Genevieve J. Knezo – Specialist in Science and Technology Policy Resources, Science, and Industry Division + this is a CRS Report for Congress, pgs. 36 – 53, “Controls on Unclassified Biological Research Information”, “’Sensitive But Unclassified’ Information and Other Controls: Policy and Options for Scientific and Technical Information”, https://fas.org/sgp/crs/secrecy/RL33303.pdf, EmmieeM)

Traditionally, open communication of biological information fosters the conduct of research and development. Also, emergency preparedness requires exchange of information to inform local health officials “... of what agents are being studied in their jurisdictions so they can prepare for any unlikely future events.”156 However, some biological information and data could pose a domestic or international security threat, which has led to federal controls.157 For instance, a 2006 National Academies report described a variety of biotechnology agents and specific genetic advances that could be used in research and could increase the potential for biowarfare.158 It also inventoried some dual-use biological agents and research developments that could be used malevolently. For example, “The same reverse genetic technologies that can be used to develop new vaccines against RNA viruses could also be used to construct modified viruses, including possibly viruses that express heterologous virulence factors that result in more lethal disease.”159 Ominously, it observed that [in] the past, dual-use concerns have focused on pathogens and on the challenges associated with controlling dangerous pathogens. As already emphasized, this committee’s deliberations have indicated that the problem will be far broader and more profound in the future. For example, advances in neurobiology may make it possible to manipulate behavior and thought processes, while gene expression technologies just now coming to fruition will make it possible to activate endogenous molecules in the body — with possibly wide ranging and everlasting effects. Advances in synthetic biology and nanotechnology will offer similar rich opportunities for dual use. Nanodevices that may be used to unplug blocked arteries could instead be employed to interfere with circulatory function. Advanced drug delivery technologies and pharmacogenomics knowledge could be used to develop and deliver with greater efficiency new bioweapons, perhaps even selectively targeting certain racial or ethnic groups.”160 To deal with concerns like these, some types of biological sciences information have already been controlled and proposals have been made to develop other types of governmental or nongovernmental systems to control access to information before research is conducted or in the prepublication phase. These proposals, which are discussed next, are not without controversy. The federal government’s regulation requiring the registration of laboratories that transferred certain “select agents” — organisms and toxins identified by the Centers for Disease Control and Prevention (CDC) as potentially useful in bioterrorist activities — began in 1996.161 Registration of laboratories that possess such agents was mandated by P.L. 107-188, “The Public Health Security and Bioterrorism Preparedness and Response Act of 2002,” enacted after the 9/11 attacks. The law requires coordination between the Department of Health and Human Services (DHHS) and the Department of Agriculture (USDA) to identify and regulate the use and transfer of such agents that pose a risk to public health, crops or livestock; registration of all facilities that use such agents; minimum safety requirements for registered facilities; background screening of persons using such agents; and a national database of such users. The USA PATRIOT Act, P.L. 107-56 prohibits access to select agents by certain persons, including certain immigrants, and persons with criminal or drug use history and other factors. Interim final regulations implementing these laws were issued in December 2002.16 National Science Advisory Board for Biosecurity. A National Academy of Sciences (NAS) report, Biotechnology Research in an Age of Terrorism: Confronting the “Dual Use” Dilemma, published in 2004 and dubbed the “Fink” report after the committee chairman, called for greater self-regulation by scientists, use of institutional biosafety committees at academic and research institutions to monitor research that could possibly aid terrorism, NIH review of certain types of research reports before they are published, and use of screening criteria in a prepublication review. Regarding private scientific publishing, the Fink report largely left it up to journal publishers to make decisions about prepublication review procedures for articles involving biological agents. The Fink report also urged creation of a new federal advisory board to guide nongovernmental researchers and to develop responsibility among scientists to control flows of biodefense information. But it did not propose governmental control of such research. In March 2004, the DHHS announced its intent to create a National Science Advisory Board for Biosecurity (NSABB), which became funded in 2005. It is managed and staffed by the National Institutes of Health (NIH). The NSABB is chartered to have 25 voting nongovernmental members with a broad range of expertise in molecular biology, microbiology, infectious diseases, biosafety, public health, veterinary medicine, plant health, national security, biodefense, law enforcement, scientific publishing, and related fields. The NSABB also includes nonvoting ex officio members from 15 federal agencies and departments. It is supposed to advise federal departments and agencies regarding oversight of dual-use nonclassified biological research. The board’s charter also includes work to develop national policies to communicate and publish sensitive research results, a code of conduct for life sciences researchers, training programs and materials to educate the community about biosecurity, and strategies to foster international collaboration to oversee dual-use life sciences research. NIH aims to use the committee’s guidance to develop policies to require performer institutions that it funds to use Institutional Biosafety Committees (IBC), to educate researchers, to issue guidance, and to review and advise on specific experiments that might be misused or pose a threat to the public health or national security. Policy guidance will flow from the federal board to the institutional committees if there is uncertainty or disagreement regarding denial of an experiment. The NSABB met several times in 2005 and 2006; it will meet next on January 31 to February 2, 2007. During its first meeting, the board established five working groups to develop criteria to identify dual-use research; criteria to communicate results of dual-use research; a life sciences code of conduct; international perspectives on dual-use research; and guidance on chemical synthesis of bacterial and viral genomes.163 Some discussants proposed that biologists should be licensed to conduct sensitive biological research, that codes of conduct would need to be certified, and that methods of assuring compliance among research institutions would need to be developed.164 Some contended that if the scientific community did not develop methods of monitoring and protecting sensitive research, policy makers might develop and try to enforce more stringent controls that ultimately might prove to be unacceptable.165 During the July 2006 meeting, NSABB recommended in draft guidelines released for public comment that authors, institutional reviewers, and journal editors conduct a risk-benefit analysis as part of “formal procedures to presecreen the publication of findings from...dual-use projects” that might be useful to terrorists.166 During its October 25, 2006 meeting,167 which addressed the topic of synthetic biology, among other things, the Board adopted draft recommendations, published for comment, that the government “regulate potentially dangerous gene sequences instead of a list of known pathogens” since the current rules for select agents identify a finite list of organisms, and do not account for biological entities that can be synthetically engineered.168 The board “...also wants the government to require companies to screen orders for synthetic DNA against the genomes of select agents and to maintain a record of purchase orders. Neither procedure is currently mandated by law.”169 Topics for subsequent NSABB meetings include developing oversight plans and implementation processes for these guidelines in academia and in government. It is likely that some scientists will object to guidelines requiring prepublication review.170

#### Bioterrorism causes extinction—no barriers to use and terrorists pursuing now

Myhrvold 13 [Nathan, PhD in Theoretical and Mathematical Physics from Princeton, and founded Intellectual Ventures after retiring as Chief Strategist and Chief Technology Officer of Microsoft Corporation, July, "Stratgic Terrorism: A Call to Action," http://www.lawfareblog.com/wp-content/uploads/2013/07/Strategic-Terrorism-Myhrvold-7-3-2013.pdf]

A virus genetically engineered to infect its host quickly, to generate symptoms slowly—say, only after weeks or months—and to spread easily through the air or by casual contact would be vastly more devastating than HIV. It could silently penetrate the population to unleash its deadly effects suddenly. This type of epidemic would be almost impossible to combat because most of the infections would occur before the epidemic became obvious. A technologically sophisticated terrorist group could develop such a virus and kill a large part of humanity with it. Indeed, terrorists may not have to develop it themselves: some scientist may do so first and publish the details. Given the rate at which biologists are making discoveries about viruses and the immune system, at some point in the near future, someone may create artificial pathogens that could drive the human race to extinction. Indeed, a detailed species-elimination plan of this nature was openly proposed in a scientific journal. The ostensible purpose of that particular research was to suggest a way to extirpate the malaria mosquito, but similar techniques could be directed toward humans.16 When I’ve talked to molecular biologists about this method, they are quick to point out that it is slow and easily detectable and could be fought with biotech remedies. If you challenge them to come up with improvements to the suggested attack plan, however, they have plenty of ideas. Modern biotechnology will soon be capable, if it is not already, of bringing about the demise of the human race— or at least of killing a sufficient number of people to end high-tech civilization and set humanity back 1,000 years or more. That terrorist groups could achieve this level of technological sophistication may seem far-fetched, but keep in mind that it takes only a handful of individuals to accomplish these tasks. Never has lethal power of this potency been accessible to so few, so easily. Even more dramatically than nuclear proliferation, modern biological science has frighteningly undermined the correlation between the lethality of a weapon and its cost, a fundamentally stabilizing mechanism throughout history. Access to extremely lethal agents—lethal enough to exterminate Homo sapiens—will be available to anybody with a solid background in biology, terrorists included. The 9/11 attacks involved at least four pilots, each of whom had sufficient education to enroll in flight schools and complete several years of training. Bin laden had a degree in civil engineering. Mohammed Atta attended a German university, where he earned a master’s degree in urban planning—not a field he likely chose for its relevance to terrorism. A future set of terrorists could just as easily be students of molecular biology who enter their studies innocently enough but later put their skills to homicidal use. Hundreds of universities in Europe and Asia have curricula sufficient to train people in the skills necessary to make a sophisticated biological weapon, and hundreds more in the United States accept students from all over the world. Thus it seems likely that sometime in the near future a small band of terrorists, or even a single misanthropic individual, will overcome our best defenses and do something truly terrible, such as fashion a bioweapon that could kill millions or even billions of people. Indeed, the creation of such weapons within the next 20 years seems to be a virtual certainty. The repercussions of their use are hard to estimate. One approach is to look at how the scale of destruction they may cause compares with that of other calamities that the human race has faced.

#### Counterplan – Public colleges and universities should establish licensing procedures for researchers in the life sciences and create an independent review board to monitor risks of biological research with the authority to deny publication.

Knezo 6 (Genevieve J. Knezo – Specialist in Science and Technology Policy Resources, Science, and Industry Division + this is a CRS Report for Congress, pgs. 36 – 53, “Controls on Unclassified Biological Research Information”, “’Sensitive But Unclassified’ Information and Other Controls: Policy and Options for Scientific and Technical Information”, https://fas.org/sgp/crs/secrecy/RL33303.pdf, EmmieeM)

Views on Adequacy of Biosecurity Protection Policies. Some critics say existing biosecurity protections are inadequate to prevent terrorists from obtaining and using biological information and suggest that stronger measures should be taken, such as creation of a network that interacts closely with intelligence and military agencies to prevent misuse of biological information.171 Related to this, a 2006 National Academies report, concerned about how new developments in the life sciences coupled with rapidly advancing fields such as nanotechnology and materials science could prove to threatening, endorsed the free and open change of information in the life sciences to the maximum extent possible. However, it also recommended, ! creating statutorily an independent advisory group in the security community to strengthen scientific and technical expertise within the intelligence and security communities; ! adopting and promoting a “common culture of awareness and a shared sense of responsibility within the global communities of life scientists,” including development of codes of ethics; and ! establishing, “... a decentralized, globally distributed network of informed concerned scientists who have the capacity to recognize when knowledge or technology is being used inappropriately or with the intent to cause harm”172 and whose interventions could take the form of counseling or “... reporting such activity to national authorities when its appears potentially malevolent in intent.”173 Other shortcomings in current policy have been identified. For instance, the scope of the DHHS’s NSABB board has been faulted because it does not extend to privately funded research nor harmonize international standards.174 Others criticize the select agent rules as inadequate and say federal regulations should be expanded to prevent unauthorized persons from possessing the DNA components of a select agent.175 George Church, a genetics professor at Harvard, reportedly “is organizing a consortium of researchers and academics to push the federal government to license anyone interested in purchasing DNA segments for agents of bioterror.”176 Similarly, John Steinbruner and colleagues at the Center for International and Security Studies at Maryland (CISSM), in a 2005 report, advocated mandatory licensure of researchers and institutions that conduct biodefense research. Three levels of independent review — at the institutional, national, and international level — would monitor risks and benefits of research proposals and would issue approval or disapproval for conduct of researchers and publications.177 Nongovernmental professional groups have explored the use of codes of conduct or self-policing policies178 for research topics and publications. Some publishers adopted a set of voluntary, risk-based publishing principles, called “Statement of Scientific Publication and Security,” 2003; but this, reportedly, has resulted in changes in only very few articles before publication.179 In June 2005, the American Society for Microbiology drafted a code of ethics for its members and urged them to report to “appropriate authorities” misuses of microbiology information.180 The Interacademy Panel on International Issues, consisting of most of the world’s national science academies, issued a set of principles that urged scientists to take responsibility to prevent misuse of their work.181 Two researchers, Margaret A. Somerville of McGill University and Ronald M. Atlas, President of the American Society for Microbiology, proposed an international code of ethics to prevent bioterrorism.182 Adherents to the code would refuse to conduct work that could be used in bioterrorism and would seek to restrict access of those they believe could use information maliciously. It was noted above in the section on “Nongovernmental Experts’ Recommendations To Use Risk Analysis To Identify and Control Sensitive Information,” that proposals have been made to instill in researchers a culture that discourages research that could be used malevolently, that professional peer reviews should be conducted before publication of work that should be protected, and that the federal government should define policy controls for these activities. In addition, J. Gaudioso and R. M. Salerno proposed a biosecurity risk assessment process that would restrict the use of agents that have the potential to be weaponized and that could serve as the basis for international standards. This process would involve using four Biosecurity levels: low, moderate, high, and extreme risk. The overwhelming majority of pathogens and toxins would fall into the low-risk category (requiring practices such as locking unattended laboratories and maintenance of documentation of agents used), and most select agents would be placed in the moderate-risk category (requiring additional safeguards such as access controls and personnel checks). The security measures for low-and moderate-risk categories should pose reasonable costs and largely rely on existing biosafety measures. Very few agents would be designated high risk (requiring more stringent security measures and a dedicated Biosecurity officer). Perhaps only variola major, because it is no longer found in nature would be considered an extreme risk, requiring the most stringent protections (such as comprehensive background investigations and an on-site guard force). Higher security than that currently mandated by federal regulations would only be applied for those very few agents that represent true weapon threats. Biosecurity levels should be developed and vetted by experts in biological weapons, microbiology, security, and public and agricultural health. This would help federal agencies apply uniform criteria to grantees and could form the basis for standardizing biosecurity internationally.183 Brian J. Gorman proposed a risk-based alternative approach for prepublication peer review. He called for a risk-based process called “Due Process Vetting System” (DPVS) together with “... a Risk Assessment Scale [RAS] and a Least Restrictive Classification System for the communication, assessment, and disposition of sensitive life science research in a manner consistent with national security interests.”184 The process would be overseen by a new agency called the Biologic Regulatory Commission, modeled after the Nuclear Regulatory Commission. The vetting process would be triggered at the request of an author or peer reviewer if an article attained a predetermined score on the RAS set by the BRC. “The RAS surveys opinions of informed reviewers including the author of the article, the author’s Institutional Review Board or Institutional Biosafety Committee (IBC), and finally the journal interested in publishing the article.”185 The DPVS would safeguard highrisk articles by providing the government with a mechanism to identify “potentially dangerous articles before they reach the presses,”186 would avoid the “deleterious effects of censorship,”187 and would make articles available only to a “select academy of biodefense researchers after the authors, the publishing journal and others, reach a consensus with the government through cooperative vetting of the article in question.”188 Gorman proposed expanding the academy to a qualified body of world scientists, an approach he said is superior to the ASM model and ad hoc approaches undertaken by the majority of U.S. biosciences journals.189

#### Biowarfare leads to extinction and is the biggest existential threat facing humanity – technological increase checks empirics and generic defense

Smart 4 (John Smart – President of the Institute for the Study of Accelerating Change. 2004

Genetically modified pathogen (GMP) Policy, August 03)

It is possible that with the mobilization of massive logistical resources around the planet,

AND

of danger has been estimated to be anywhere from 30 to 50.”

### funding DA

#### Absent secrecy, certain cooperative research efforts would be impossible

Downs 4 (DA Downs – The Independent Institute, Oakland and The University of Wiscosin, Madison, “Restoring Free Speech and Liberty on Campus”, pg. xvi, http://www.thedivineconspiracy.org/Z5243N.pdf , EmmieeM)

Although this book stresses the threats to academic and intellectual freedom posed by speech codes and related policies, it should be noted that freedom is also threatened by other sources, especially in the post–September 11 world. To begin, the modern university has long been engaged in industrial and governmental research that coexists uneasily with the university’s erstwhile mission of open discourse. Such research benefits society and brings needed money into the university. But the benefits sometimes come at a price that includes limitations on speech and discourse. This trend has accelerated in recent years as state support has declined while the costs of higher education have escalated. Today, many universities engage in research with government agencies and corporations that require recipients to maintain silence about the nature of the research. Though understandable in certain contexts, the extension of such gag orders poses a challenge to the idea of an open university.2

#### Continued government funding and support is critical for continued university research programs, which is the lynchpin of innovation and competitiveness – that's key to US dominance

NSB no date (National Science Board, “Research and Development: Essential Foundation For U.S. Competitiveness in a Global Economy”, “Global Competition in Science and Technology: A Strong National Response Required”, https://www.nsf.gov/statistics/nsb0803/start.htm, EmmieeM)

Innovation is a key to economic competitiveness and the technological breakthroughs that improve our lives. Basic research fuels technological innovations and is critical in fostering the vitality of the U.S. science and technology enterprise and the growth of highly-skilled jobs. The scientific and technological advances that have led to our Nation’s remarkable ability to create new industries and jobs, improve the standard of living for people, and provide sophisticated technology that ensures our national security can be traced back to the outcomes of basic research. Although industry funds two-thirds of U.S. R&D, the majority of basic research is conducted by research universities, and the U.S. Government has long recognized the importance of public support for these institutions. The Federal Government established the basis for the Nation’s land grant institutions through the Morrill Acts[4] in the second half of the 19th century. During World War II, the wartime success of the partnership between universities and the Federal Government through the Office of Scientific Research and Development (OSRD) led to a proposal—requested by the President—from the head of OSRD for public funding for research, specifically basic research, in academic institutions and research institutes. Such funding would encourage the creation of knowledge and employ science and engineering (S&E) for discovery and innovation—and thereby expand national economic growth, increase employment, and improve the quality of life. This proposal ultimately led to the creation of the National Science Foundation (NSF). Through its support of entities that fund basic research, the U.S. Government helps underwrite our national infrastructure for science and engineering R&D and thereby the global preeminence of the U.S. in S&E innovation. Over time, the Federal Government support for R&D, and the related important efforts of industry, have grown into a complex and changing web. Given the impacts on the national innovation infrastructure of changes in investment patterns, it is imperative that patterns and trends of R&D investments be monitored.

#### Innovation solves great power war

Taylor 4 – Professor of Political Science, Massachusetts Institute of Technology (Mark, “The Politics of Technological Change: International Relations versus Domestic Institutions,” Massachusetts Institute of Technology, 4/1/2004, <http://www.scribd.com/doc/46554792/Taylor>) //RGP

I. Introduction Technological innovation is of central importance to the study of international relations (IR), affecting almost every aspect of the sub-field. First and foremost, a nation’s technological capability has a significant effect on its economic growth, industrial might, and military prowess; therefore relative national technological capabilities necessarily influence the balance of power between states, and hence have a role in calculations of war and alliance formation. Second, technology and innovative capacity also determine a nation’s trade profile, affecting which products it will import and export, as well as where multinational corporations will base their production facilities. Third, insofar as innovation-driven economic growth both attracts investment and produces surplus capital, a nation’s technological ability will also affect international financial flows and who has power over them. Thus, in broad theoretical terms, technological change is important to the study of IR because of its overall implications for both the relative and absolute power of states. And if theory alone does not convince, then history also tells us that nations on the technological ascent generally experience a corresponding and dramatic change in their global stature and influence, such as Britain during the first industrial revolution, the United States and Germany during the second industrial revolution, and Japan during the twentieth century. Conversely, great powers which fail to maintain their place at the technological frontier generally drift and fade from influence on international scene. This is not to suggest that technological innovation alone determines international politics, but rather that shifts in both relative and absolute technological capability have a major impact on international relations, and therefore need to be better understood by IR scholars. Indeed, the importance of technological innovation to international relations is seldom disputed by IR theorists. Technology is rarely the sole or overriding causal variable in any given IR theory, but a broad overview of the major theoretical debates reveals the ubiquity of technological causality. For example, from Waltz to Posen, almost all Realists have a place for technology in their explanations of international politics. At the very least, they describe it as an essential part of the distribution of material capabilities across nations, or an indirect source of military doctrine. And for some, like Gilpin quoted above, technology is the very cornerstone of great power domination, and its transfer the main vehicle by which war and change occur in world politics. Jervis tells us that the balance of offensive and defensive military technology affects the incentives for war. Walt agrees, arguing that technological change can alter a state’s aggregate power, and thereby affect both alliance formation and the international balance of threats. Liberals are less directly concerned with technological change, but they must admit that by raising or lowering the costs of using force, technological progress affects the rational attractiveness of international cooperation and regimes. Technology also lowers information & transactions costs and thus increases the applicability of international institutions, a cornerstone of Liberal IR theory. And in fostering flows of trade, finance, and information, technological change can lead to Keohane’s interdependence or Thomas Friedman et al’s globalization. Meanwhile, over at the “third debate”, Constructivists cover the causal spectrum on the issue, from Katzenstein’s “cultural norms” which shape security concerns and thereby affect technological innovation; to Wendt’s “stripped down technological determinism” in which technology inevitably drives nations to form a world state. However most Constructivists seem to favor Wendt, arguing that new technology changes people’s identities within society, and sometimes even creates new cross-national constituencies, thereby affecting international politics. Of course, Marxists tend to see technology as determining all social relations and the entire course of history, though they describe mankind’s major fault lines as running between economic classes rather than nation-states. Finally, Buzan & Little remind us that without advances in the technologies of transportation, communication, production, and war, international systems would not exist in the first place.

#### US leadership prevents great power war and existential governance crises

Brooks, Ikenberry, and Wohlforth ’13 (Stephen, Associate Professor of Government at Dartmouth College, John Ikenberry is the Albert G. Milbank Professor of Politics and International Affairs at Princeton University in the Department of Politics and the Woodrow Wilson School of Public and International Affairs, William C. Wohlforth is the Daniel Webster Professor in the Department of Government at Dartmouth College “Don’t Come Home America: The Case Against Retrenchment,” International Security, Vol. 37, No. 3 (Winter 2012/13), pp. 7–51)

A core premise of deep engagement is that it prevents the emergence of a far more dangerous global security environment. For one thing, as noted above, the United States’ overseas presence gives it the leverage to restrain partners from taking provocative action. Perhaps more important, its core alliance commitments also deter states with aspirations to regional hegemony from contemplating expansion and make its partners more secure, reducing their incentive to adopt solutions to their security problems that threaten others and thus stoke security dilemmas. The contention that engaged U.S. power dampens the baleful effects of anarchy is consistent with influential variants of realist theory. Indeed, arguably the scariest portrayal of the war-prone world that would emerge absent the “American Pacifier” is provided in the works of John Mearsheimer, who forecasts dangerous multipolar regions replete with security competition, arms races, nuclear proliferation and associated preventive war temptations, regional rivalries, and even runs at regional hegemony and full-scale great power war. 72 How do retrenchment advocates, the bulk of whom are realists, discount this benefit? Their arguments are complicated, but two capture most of the variation: (1) U.S. security guarantees are not necessary to prevent dangerous rivalries and conflict in Eurasia; or (2) prevention of rivalry and conflict in Eurasia is not a U.S. interest. Each response is connected to a different theory or set of theories, which makes sense given that the whole debate hinges on a complex future counterfactual (what would happen to Eurasia’s security setting if the United States truly disengaged?). Although a certain answer is impossible, each of these responses is nonetheless a weaker argument for retrenchment than advocates acknowledge. The first response flows from defensive realism as well as other international relations theories that discount the conflict-generating potential of anarchy under contemporary conditions. 73 Defensive realists maintain that the high expected costs of territorial conquest, defense dominance, and an array of policies and practices that can be used credibly to signal benign intent, mean that Eurasia’s major states could manage regional multipolarity peacefully without the American pacifier. Retrenchment would be a bet on this scholarship, particularly in regions where the kinds of stabilizers that nonrealist theories point to—such as democratic governance or dense institutional linkages—are either absent or weakly present. There are three other major bodies of scholarship, however, that might give decisionmakers pause before making this bet. First is regional expertise. Needless to say, there is no consensus on the net security effects of U.S. withdrawal. Regarding each region, there are optimists and pessimists. Few experts expect a return of intense great power competition in a post-American Europe, but many doubt European governments will pay the political costs of increased EU defense cooperation and the budgetary costs of increasing military outlays. 74 The result might be a Europe that is incapable of securing itself from various threats that could be destabilizing within the region and beyond (e.g., a regional conflict akin to the 1990s Balkan wars), lacks capacity for global security missions in which U.S. leaders might want European participation, and is vulnerable to the influence of outside rising powers. What about the other parts of Eurasia where the United States has a substantial military presence? Regarding the Middle East, the balance begins to swing toward pessimists concerned that states currently backed by Washington— notably Israel, Egypt, and Saudi Arabia—might take actions upon U.S. retrenchment that would intensify security dilemmas.

And concerning East Asia, pessimism regarding the region’s prospects without the American pacifier is pronounced. Arguably the principal concern expressed by area experts is that Japan and South Korea are likely to obtain a nuclear capacity and increase their military commitments, which could stoke a destabilizing reaction from China. It is notable that during the Cold War, both South Korea and Taiwan moved to obtain a nuclear weapons capacity and were only constrained from doing so by a still-engaged United States. 75 The second body of scholarship casting doubt on the bet on defensive realism’s sanguine portrayal is all of the research that undermines its conception of state preferences. Defensive realism’s optimism about what would happen if the United States retrenched is very much dependent on its particular—and highly restrictive—assumption about state preferences; once we relax this assumption, then much of its basis for optimism vanishes. Specifically, the prediction of post-American tranquility throughout Eurasia rests on the assumption that security is the only relevant state preference, with security defined narrowly in terms of protection from violent external attacks on the homeland. Under that assumption, the security problem is largely solved as soon as offense and defense are clearly distinguishable, and offense is extremely expensive relative to defense. Burgeoning research across the social and other sciences, however, undermines that core assumption: states have preferences not only for security but also for prestige, status, and other aims, and they engage in trade-offs among the various objectives. 76 In addition, they define security not just in terms of territorial protection but in view of many and varied milieu goals. It follows that even states that are relatively secure may nevertheless engage in highly competitive behavior. Empirical studies show that this is indeed sometimes the case. 77 In sum, a bet on a benign postretrenchment Eurasia is a bet that leaders of major countries will never allow these nonsecurity preferences to influence their strategic choices. To the degree that these bodies of scholarly knowledge have predictive leverage, U.S. retrenchment would result in a significant deterioration in the security environment in at least some of the world’s key regions. We have already mentioned the third, even more alarming body of scholarship. Offensive realism predicts that the withdrawal of the American pacifier will yield either a competitive regional multipolarity complete with associated insecurity, arms racing, crisis instability, nuclear proliferation, and the like, or bids for regional hegemony, which may be beyond the capacity of local great powers to contain (and which in any case would generate intensely competitive behavior, possibly including regional great power war). Hence it is unsurprising that retrenchment advocates are prone to focus on the second argument noted above: that avoiding wars and security dilemmas in the world’s core regions is not a U.S. national interest. Few doubt that the United States could survive the return of insecurity and conflict among Eurasian powers, but at what cost? Much of the work in this area has focused on the economic externalities of a renewed threat of insecurity and war, which we discuss below. Focusing on the pure security ramifications, there are two main reasons why decisionmakers may be rationally reluctant to run the retrenchment experiment. First, overall higher levels of conflict make the world a more dangerous place. Were Eurasia to return to higher levels of interstate military competition, one would see overall higher levels of military spending and innovation and a higher likelihood of competitive regional proxy wars and arming of client states—all of which would be concerning, in part because it would promote a faster diffusion of military power away from the United States. Greater regional insecurity could well feed proliferation cascades, as states such as Egypt, Japan, South Korea, Taiwan, and Saudi Arabia all might choose to create nuclear forces. 78 It is unlikely that proliferation decisions by any of these actors would be the end of the game: they would likely generate pressure locally for more proliferation. Following Kenneth Waltz, many retrenchment advocates are proliferation optimists, assuming that nuclear deterrence solves the security problem. 79 Usually carried out in dyadic terms, the debate over the stability of proliferationchanges as the numbers go up. Proliferation optimism rests on assumptions of rationality and narrow security preferences. In social science, however, such assumptions are inevitably probabilistic. Optimists assume that most states are led by rational leaders, most will overcome organizational problems and resist the temptation to preempt before feared neighbors nuclearize, and most pursue only security and are risk averse. Confidence in such probabilistic assumptions declines if the world were to move from nine to twenty, thirty, or forty nuclear states. In addition, many of the other dangers noted by analysts who are concerned about the destabilizing effects of nuclear proliferation—including the risk of accidents and the prospects that some new nuclear powers will not have truly survivable forces—seem prone to go up as the number of nuclear powers grows. 80 Moreover, the risk of “unforeseen crisis dynamics” that could spin out of control is also higher as the number of nuclear powers increases. Finally, add to these concerns the enhanced danger of nuclear leakage, and a world with overall higher levels of security competition becomes yet more worrisome. The argument that maintaining Eurasian peace is not a U.S. interest faces a second problem. On widely accepted realist assumptions, acknowledging that U.S. engagement preserves peace dramatically narrows the difference between retrenchment and deep engagement. For many supporters of retrenchment, the optimal strategy for a power such as the United States, which has attained regional hegemony and is separated from other great powers by oceans, is offshore balancing: stay over the horizon and “pass the buck” to local powers to do the dangerous work of counterbalancing any local rising power. The United States should commit to onshore balancing only when local balancing is likely to fail and a great power appears to be a credible contender for regional hegemony, as in the cases of Germany, Japan, and the Soviet Union in the midtwentieth century. The problem is that China’s rise puts the possibility of its attaining regional hegemony on the table, at least in the medium to long term. As Mearsheimer notes, “The United States will have to play a key role in countering China, because its Asian neighbors are not strong enough to do it by themselves.” 81 Therefore, unless China’s rise stalls, “the United States is likely to act toward China similar to the way it behaved toward the Soviet Union during the Cold War.” 82 It follows that the United States should take no action that would compromise its capacity to move to onshore balancing in the future. It will need to maintain key alliance relationships in Asia as well as the formidably expensive military capacity to intervene there. The implication is to get out of Iraq and Afghanistan, reduce the presence in Europe, and pivot to Asia— just what the United States is doing. 83 In sum, the argument that U.S. security commitments are unnecessary **for peace** is countered by a lot of scholarship, including highly influential realist scholarship. In addition, the argument that Eurasian peace is unnecessary for U.S. security is weakened by the potential for a large number of nasty security consequences as well as the need to retain a latent onshore balancing capacity that dramatically reduces the savings retrenchment might bring. Moreover, switching between offshore and onshore balancing could well be difªcult. Bringing together the thrust of many of the arguments discussed so far underlines the degree to which the case for retrenchment misses the underlying logic of the deep engagement strategy. By supplying reassurance, deterrence, and active management, the United States lowers security competition in the world’s key regions, thereby preventing the emergence of a hothouse atmosphere for growing new military capabilities. Alliance ties dissuade partners from ramping up and also provide leverage to prevent military transfers to potential rivals. On top of all this, the United States’ formidable military machine may deter entry by potential rivals. Current great power military expenditures as a percentage of GDP are at historical lows, and thus far other major powers have shied away from seeking to match top-end U.S. military capabilities. In addition, they have so far been careful to avoid attracting the “focused enmity” of the United States. 84 All of the world’s most modern militaries are U.S. allies (America’s alliance system of more than sixty countries now accounts for some 80 percent of global military spending), and the gap between the U.S. military capability and that of potential rivals is by many measures growing rather than shrinking. 85

#### Competitiveness is key to US dominance – we need to keep innovating faster to ensure economic prosperity and hegemony

Segal 04 – Senior Fellow in China Studies at the Council on Foreign Relations

Adam, Foreign Affairs, “Is America Losing Its Edge?” November / December 2004, http://www.foreignaffairs.org/20041101facomment83601/adam-segal/is-america-losing-its-edge.html

The United States' global primacy depends in large part on its ability to develop new

AND

, the United States must get better at fostering technological entrepreneurship at home.

Loss of competitiveness results in great power conflict—retrenchment makes war inevitable and ensures the US would be dragged in – that causes your heg bad impacts so it’s try or die for the AFF

Khalilzad 11 — Zalmay Khalilzad, Counselor at the Center for Strategic and International Studies, served as the United States ambassador to Afghanistan, Iraq, and the United Nations during the presidency of George W. Bush, served as the director of policy planning at the Defense Department during the Presidency of George H.W. Bush, holds a Ph.D. from the University of Chicago, 2011 (“The Economy and National Security,” National Review, February 8th, Available Online at http://www.nationalreview.com/articles/print/259024, Accessed 02-08-2011)

Today, economic and fiscal trends pose the most severe long-term threat to

AND

leading the world toward a new, dangerous era of multi-polarity.

### T cuts

#### Academic speech is clearly protected speech

Byrne 89 [J. Peter Byrne (Associate Professor, Georgetown University Law Center), "Academic Freedom: A ‘Special Concern of the First Amendment’," Yale Law Journal, 1989] AZ

Academic speech-a term I use to encompass both scholarship and teaching-has unique value because of the disciplinary and ethical constraints under which it is produced. Scholars work within a discipline, primarily addressing other scholars and students. Their audience understands and evaluates their speech within a tradition of knowledge, shared assumptions and arguments about methodology and criteria, and common objectives of exploration or discovery. This learned and critical audience provides comfort and challenge to the academic speaker; he knows that his auditors will listen with care, consider with knowledge, and challenge with intelligence. The speaker cannot persuade her colleagues by her social standing, physical strength or the raw vehemence of her argument; she must persuade on the basis of reason and evidence (concepts vouchsafed, if only contingently, by her discipline). The ordinary criterion of success is whether, through mastery of the discipline's discourse, the scholar improves the account of some worthy subject that the discipline has previously accepted. Academic speech is rigidly formalistic. Every lecture or article must presuppose the history and current canon of the discipline; every departure from common understandings must be explained and justified. Many lovely and personally satisfying styles of expression are outlawed: The physicist may not sing, the historian may not whine, the economist may not offer the primordial scream. More seriously, the persons who may engage in this speech are rigorously controlled. To enter the discourse, the scholar must proceed through the university course of study-at great expense and personal sacrifice-in order to be certified by her peers as competent to engage in scholarly exchange. Students, even though adults in civil society, are admitted as neophytes and treated as intellectual dependents, so long as they lack mastery or certification. Students and junior professors suffer real punishment for speech deemed inadequate by the masters. In general civil society, the First Amendment opposes both prior and subsequent restraint on the speaker by a class of officials determining which speech is valuable and which is not.2 Yet within these constraints, the academic speaker in control of his methodology is free to reach conclusions that contradict previous dogma, whether within the academy or throughout the larger society. Indeed, such contradiction is prized as new knowledge, the mark of contribution, the sine qua non of the doctoral dissertation. Moreover, the community of scholars will close ranks behind even the most mediocre scholar whenever civil authority threatens to punish unorthodox scholarship. Those instances where it has failed to defend its fellows are incidents of permanent shame and regret.22 This essential freedom has been at the core of professorial insistence on faculty autonomy within the university power structure. It obviously resonates with traditional First Amendment liberty. But the simple fact that such speech strives to be free in its application of methodology to reach controversial conclusions does not set it apart within First Amendment values. The unique point is that academic speech can be more free than the speaker; that the speaker may be driven to conclusions by her respect for methodology and evidence that contradict her own preconceptions and cherished assumptions. The scholar cannot argue merely for her political party, religion, class, race, or gender; she must acknowledge the hard resistance of the subject matter, the inadequacies of friends' arguments, and the force of those of her enemies. That is what scholars mean by disinterested argument-not indifference to the outcome, but insistence that commitment not weaken the rigor and honesty by which the argument is pursued. The First Amendment value of academic speech rests on its commitment to truth (however partially understood by the discipline), its honesty and carefulness, its richness of meaning, its doctrinal freedom, and its invitation to criticism. These are not often identified as the justifications for the First Amendment protection of speech. 3 In society at large, freedom of speech insulates from penalty expression that is vulgar, pernicious, incomprehensible, and mad.2 Even advertising, which is wholly selfinterested and manipulative, is protected.25 Only genitalia and false statements of fact may usually be regulated,2 and verbal provocations to crime, violence and riot may be prohibited.2 " The justifications for this regime are various but persuasive. First Amendment doctrine recognizes the danger to a democratic political process if officials proscribe some subjects or modes of expression.28 This sensitivity is heightened by the enormous cultural diversity of the American polity. Advocates of free expression also properly cast doubt both on the wisdom of officials, even when acting in good faith, to decide which ideas are out of bounds and on the efficacy of combatting apparently dangerous ideas by suppressing them.29 Finally, many recognize the value to the individual citizen of being the sole legal arbiter of what she shall say, read or think; such freedom and responsibility dignify the citizen in a democracy." Yet can it be said that these familiar themes exhaust the value to democratic society of free expression? The First Amendment ought also to be aspirational. Society ought to strive toward speech that is truthful, gracious, well-considered, and generous to opponents. It ought not settle for, though it must often permit, speech that is ignorant, self-interested, manipulative, hateful or vapid. Without some such ideal, actively pursued, speech loses its value as communication, and thought loses its power to persuade through appeal to reason. When discourse becomes debased, conflict of interests within democratic society cannot be resolved or lessened through debate or deliberation (because no one will take them seriously) but only through the parlay of money, numbers and force. Speech should be protected because it is beneficial. Preeminent among the systems of discourse within our diverse society, academic speech holds expression to high standards. For all the notorious faults of jargon and circumlocution associated with scholarship, academic speech provides our most important model of expression that is meaningful as well as free, coherent yet diverse, critical and inspirational. The nature of this importance will be explored more fully below, but I wish to emphasize here that much of its value is social-it contributes profoundly to society at large. We employ the expositors of academic speech to train nearly everyone who exercises leadership within our society. Beyond whatever specialized learning our graduates assimilate, they ought to be persuaded that careful, honest expression demands an answer in kind. The experience of academic freedom helps secure broader, positive liberties of expression. The judges who pioneered the modern doctrine of free speech followed Mill in arguing that even hateful speech must be tolerated, because such speech may be true. Suppression is unnecessary, moreover, because truth will emerge in any open competition with falsehood. The problems with this argument are familiar and many. 31 For example, proponents of falsehoods may employ powerful means of persuasion, such as television commercials that endow their views with glamour or associate them with attractive symbols. The mass audience may lack the interest, information or intelligence necessary to sift through specious propositions. But, as Professor Schauer has pointed out, this "argument from truth" holds sound for smaller social groups committed to rational thinking and to pursuit of truth as a primary value. 2 The structures of academic discourse can be justified because they facilitate the rational pursuit of truth. Academic freedom resembles other free expression values insofar as it protects the individual scholar's point of view; it is distinct insofar as it protects those structures that permit the individual scholar to engage with others in collective scholarship. I shall argue below that constitutional academic freedom should protect these structures from extramural political distortion.

#### Science research is protected by the First Amendment

Ram 17 [Natalie Ram (Assistant Professor, University of Baltimore School of Law), "Science as Speech," Iowa Law Review, 2017] AZ

Constitutional scholars have devoted extensive time and energy to identifying the values underlying the First Amendment’s Free Speech Clause. Under some theories, the ability of listeners to access information is of utmost importance,55 while participation in meaning-making is most closely valued under others.56 Across these theories, however, runs a common concern: preventing the State from skewing the range of knowledge available to consider, try on, or build upon. In turn, as set forth below, these theories evince a concern about government interference with knowledge production. Such a concern is readily apparent in both the self-governance and truthseeking theories of the First Amendment. Under the self-governance theory, Alexander Meiklejohn described the First Amendment as insurance “that no suggestion of policy shall be denied a hearing because it is on one side of the issue rather than another,” and not as “the guardian of unregulated talkativeness.”57 Under the truth-seeking theory, all ideas outside of low speech categories58 are equally protected because “[a]n individual who seeks knowledge and truth must hear all sides of the question, consider all alternatives, test his judgment by exposing it to opposition, and make full use of different minds.”59 The central concern of the pursuit-of-truth understanding of the First Amendment, as in the self-governance theory, is for the ideas expressed rather than a particular speaker’s ability to speak. The principal instinct in both the truth-seeking and self-governance theories suggest that the First Amendment is concerned primarily with facilitating knowledge formation and exchange. Building from this foundation, the First Amendment must also be concerned with the production of ideas and information. James Madison recognized the connection between an informed public and one able to pursue the production of information, writing, “[a] popular Government, without popular information, or the means of acquiring it, is but a Prologue to a Farce or a Tragedy; or perhaps both.”60 Just as the First Amendment constrains the State in closing down sectors of debate simply because the State does not like the ideas involved, the First Amendment must likewise constrain (to some degree) the State’s authority to suppress activities that generate ideas and knowledge in the first place. If this were not so, then the State would be free to shape and control the cacophony within the public sphere of free expression in impermissible ways by selectively suppressing the production of knowledge about certain subjects and ideas. Concern for knowledge production is similarly at the core of other prominent First Amendment theories. Under Seana Valentine Shiffrin’s thinker-based approach, free speech theory “takes to be central the individual agent’s interest in the protection of the free development and operation of her mind.”61 In articulating the scope of what triggers First Amendment scrutiny pursuant to the thinker-based approach, Shiffrin identifies knowledge production. She explains that government regulation may run afoul for the thinker-based approach when, among other things, it “ban[s] or attempt[s] to ban the free development and operation of a person’s mind or those activities or materials necessary for its free development and operation.”62 In other words, government regulation implicates the First Amendment where it interferes with activities that give rise to the free development and operation of the mind. Moreover, Shiffrin explains that speech is especially important and worthy of constitutional protection because it has the capacity to be “exploratory[,] to allow us in a non-committal way to try on an idea.”63 This description of the importance of speech reflects the importance of knowledge production in two ways. First, that if there may be regulation of knowledge produced, there will be a skewed universe of ideas to “try on.” Second, that scientific experimentation, more specifically, may itself be described in much the same way Shiffrin describes speech—as “exploratory” and a way to test an idea.64 Similarly, those who link the First Amendment to democratic culture and the information society recognize the central role of knowledge production and access to knowledge. Jack Balkin argues that “[t]he purpose of freedom of speech . . . is to promote a democratic culture” that “allows ordinary people to participate freely in the spread of ideas and in the creation of meanings that, in turn, help constitute them as persons.”65 Balkin explains that “[i]n a democratic culture people are free to appropriate elements of culture that lay to hand, criticize them, build upon them, and create something new that is added to the mix of culture and its resources.”66 He emphasizes “each individual’s ability to participate in the production and distribution of culture.”67 Indeed, much of Balkin’s theory of democratic culture focuses on “production” and “creation”—acts that cohere with a First Amendment drive toward knowledge production. Under this approach, Balkin criticizes state regulations that target “party A in order to control speaker B.”68 Collateral censorship of this kind similarly arises in the context of knowledgeproduction regulation more broadly, wherein the State restricts individuals engaged in knowledge production in order to prevent certain knowledge from becoming available for debate and discussion. In both instances, the State targets a non-traditional actor in order to suppress related First Amendment activity. Viewing the First Amendment as essential to a democratic culture once again necessitates First Amendment attention to government regulation of knowledge production itself. Finally, characterizing the First Amendment as concerned with knowledge production also brings it into harmony, rather than tension, with the Progress Clause. The Supreme Court has observed, “[t]he [Progress] Clause and First Amendment were adopted close in time. This proximity indicates that, in the Framers’ view, copyright’s limited monopolies are compatible with free speech principles.”69 As discussed above, the “Science” identified in the Progress Clause “was used to denote any branch of organized or demonstrated knowledge.”70 Thus, the Framers of the Constitution intended the Progress Clause to promote knowledge production broadly. A First Amendment that is likewise protective of knowledge producing activities is most appropriate theoretically, historically, and doctrinally. In sum, knowledge production generally embodies deep principles and values of First Amendment theory. Under a number of theories about the guiding principles of the Free Speech Clause, a concern for knowledge production is essential. The ability to speak or listen to all ideas or viewpoints—activities that the First Amendment strongly protects—is of little meaning if the State can simply prevent people from ever discovering certain kinds of knowledge. B. SCIENCE AND THE MODES OF KNOWLEDGE PRODUCTION Scientific experimentation is one of the primary means by which people develop new knowledge. There are three readily identifiable modes of producing knowledge, two of which already receive strong First Amendment protection: philosophy (knowledge production by dialectic) and art (knowledge production through expression). Science, or knowledge production through experimentation guided by empirical methodologies, deserves similar constitutional attention. Philosophy and the liberal arts are notable knowledge-production engines because they rely on processes of dialectic, analysis, and reason to arrive at novel conclusions or conjectures. Philosophy is presently protected under the First Amendment on theories of protection for communicative acts as well as for “individual freedom of mind.”71 As set forth above, the freedom to think is indispensable to discovering new ideas and information, and the knowledge generated in dialectic exchange is a core First Amendment concern.72 Accordingly, philosophy and the liberal arts merit First Amendment protection because they are primary modes of knowledge production. Indeed, courts frequently act in accord with the knowledgeproduction rationale in their holdings, if not in their explicit reasoning.73 Art, like philosophy, not only introduces and expresses new ideas, but it can also trigger, result from, or represent new ways of thinking about the world. Art can provoke intense discussion, make a statement, or challenge norms and the status quo.74 Visual art is generally deemed protected expression under the First Amendment.75 Because of its ability to communicate directly, courts recognize that art falls within the scope of “speech” that is the forefront of First Amendment protection.76 Insofar as art produces knowledge, however, it should likewise trigger First Amendment scrutiny. Finally, science represents one of the primary ways in which people produce knowledge. CRISPR/Cas9 and SCNT technology, among other scientific advances, introduced new knowledge about our genetic heritage and how it may be manipulated; they also raise profound questions about what it is to be human and a morally relevant member of the human community.77 Similarly, research investigating what made the 1918 flu so virulent allayed some scientific and public health concerns about recurrence of that virus, while also raising fears that the results of such research might be misused to create new pathogens.78 To say that the knowledge produced through science can change the way in which we see the world and ourselves in it is an understatement. After all, Nicolaus Copernicus challenged centuries of settled “truth” by radically suggesting that the Sun, and not the Earth, was the center of the solar system.79 Charles Darwin challenged humanity’s superiority to other animals by suggesting a close relationship between man and other apes.80 Albert Einstein revolutionized physics and our understanding of the universe through his theory on relativity.81 James Watson and Francis Crick cracked the riddle of DNA and put biology and biotechnology into common knowledge.82 That science may draw political fire is likewise apparent. The most recent U.S. presidential election cycle featured a candidate campaigning on the blunt statement, “I believe in science.”83 Nor is such controversy a recent phenomenon. Galileo Galilei faced the Inquisition over his embrace of the Copernican solar system and his own research stemming from it.84 Darwin’s work continues to reverberate in many spheres, leading to political strife and political capital.85 It was at Einstein’s urging that President Theodore Roosevelt authorized the Manhattan Project, which created the atom bomb.86 And Ian Wilmut’s work on SCNT87 triggered worldwide outcry because cloning, if applied to humans, threatened to undermine what it means to be human. Human reproductive cloning, after all, “forces us to rethink in the most basic way the meaning of individuality, personal identity, family, and reproductive liberty. These concepts are well-formed at their core, but they blur at the margins.”88 If regulating scientific experimentation fell entirely outside the scope of the First Amendment, then much of the information that informs new understandings of the world, much less understandings of policy proposals in the United States, would be in jeopardy. Science tends to shake things up and to undermine long-held assumptions. In many cases, the knowledge produced through science can seem politically threatening to those in power. Germline gene editing, like human cloning, may destabilize traditional notions surrounding “individuality, personal identity, family, and reproductive liberty” by potentially putting tremendous power to shape future generations gene by gene in the control of reproducing (or cloning) individuals.89 Beyond the biological sciences, research on gun violence might yield data supporting open-carry legislation as a means to save lives—or it might show that such legislation increases, rather than decreases, gun violence and gun deaths.90 The power to exclude unfavorable or disliked information from the public sphere of free expression by prohibiting experimentation aimed at its discovery would vest extraordinary power in the hands of government to shape the content of public discourse. This means that a First Amendment concerned with protecting the production of knowledge must protect in some measure science from undue regulation.

#### Precursor to speech

Ram 17 [Natalie Ram (Assistant Professor, University of Baltimore School of Law), "Science as Speech," Iowa Law Review, 2017] AZ

SCIENTIFIC RESEARCH AS A NECESSARY PRECURSOR TO PROTECTED SPEECH One alternative idea is that the main value of science comes from scientific publication and dissemination, which are clearly protected by the First Amendment. Given this protection, several scholars argue that activities that are not themselves expressive—like applying scientific methodologies— may be accorded First Amendment protection because of their close relationship to protected-speech activities. In a nutshell, “[i]f writing, printing, and reproducing information are essential for publication, and, therefore, are protected, it must also follow that even earlier stages in the publication process are protected.”132 In reaching this conclusion, these scholars rely on an analogy of the generation of scientific information to a presumed right to gather news inhering generally in the press. This essential-preconditions approach based on a newsgathering right stands on firmer footing than its expressive-conduct counterpart. The Court has, at times, applied what appears to be heightened scrutiny to First Amendment claims by newsgathering entities. In Branzburg v. Hayes, the Court recognized that “without some protection for seeking out the news, freedom of the press could be eviscerated.”133 Similarly, the Court in Houchins v. KQED recognized “an undoubted right to gather news ‘from any source by means within the law.’”134 There are, however, a variety of complications with the analogy to newsgathering and the essential-preconditions approach. Most importantly, although the Court has alluded to some protection for newsgathering, the scope and even the existence of such a right remain frustratingly unclear. The Supreme Court has consistently declined to enforce such protection. In Zemel v. Rusk, for instance, the Court upheld the denial of Zemel’s passport application for travel to Cuba, despite Zemel’s information-gathering purpose in seeking to travel.135 Similarly, despite its solicitous language in Branzburg, the Court nonetheless denied journalists the ability to withhold the names of confidential sources from grand juries.136 Even Houchins is of little aid in defining a newsgathering right on which a right to employ scientific methodologies might be based. Houchins denied the press (as opposed to the public) a special right of access to investigate prisons.137 In the primary outlier case, Richmond Newspapers v. Virginia, the Court established a right of access for the press (and the public) to criminal trials, invalidating a Virginia statute authorizing the closing of courts.138 However, the Court based this right on “tradition” and not on the press’ information-gathering power.139 It is therefore a mistake to hinge a right to employ scientific methodologies on a right to gather news, because it is unclear whether and to what extent a right to gather news even exists. The Court’s reluctance to embrace a newsgathering right is perhaps unsurprising, given the context on which the Court focuses in such cases: instances in which the entity from which the press seeks information has strong countervailing claims. The government’s interest in preventing the press from gathering as-yet-undisclosed government information has weighed strongly in the Supreme Court’s line of newsgathering cases.140 Furthermore, even if the Court were inclined to protect a right to newsgathering, it is not clear that such a right would also protect implementing scientific methodologies. As described above, the Court has continually declined to identify the scope and contours of a newsgathering right. In Branzburg, the Court provided some indication for this hesitancy, stating that “[t]he administration of a constitutional newsman’s privilege would present practical and conceptual difficulties of a high order.”141 The Court explained that demarcating a right to newsgathering would be perilous because it would require courts either to engage in making unconstitutional distinctions between classes of protected speech (and their necessary precursors) or to accept a seemingly limitless right to engage in essential precursors to protected speech in all its forms.142 The Supreme Court has long recognized the lack of a limiting principle for a right to gather information, noting that “[t]here are few restrictions on action which could not be clothed by ingenious argument in the garb of decreased data flow.”143 If all such restrictions were invalid, then many necessary criminal laws would suddenly become inoperative. The Supreme Court has identified entry into the White House,144 stealing documents,145 and private wiretapping146 as activities that “could provide newsworthy information,” but for which “neither reporter nor source is immune from conviction for such conduct, whatever the impact on the flow of news.”147 Moreover, even innocuous activities would be protected under the First Amendment on an essential-preconditions approach. For instance, baking a cake could be constitutionally protected if its purpose was to inform later writing and publication about that experience (and the proliferation of selfpublication about food on blogs,148 Instagram,149 and Pinterest150 suggest that such purpose is not unlikely).151 Such a broad approach to protecting otherwise non-expressive conduct under the First Amendment is in tension, if not in conflict, with the purposes of the Free Speech Clause, which may include protection for all manner of communication, but cannot logically aim to encompass every act that may further communication.152 Acknowledging this limitation, some defenders of a right to newsgathering and a correlated right to employ scientific methodologies have attempted to carve out newsgathering and science as especially protected “[b]ecause scientific researchers, like the press, generate knowledge relevant to a wide range of public and private decisionmaking.”153 This logic attempts to tease out certain kinds of speech as more worthy of protection than others, the essential precursors of the former receiving constitutional protection as well. Yet, such an approach would require courts to engage in substantive evaluations of the worthiness of different classes of protected speech. To be sure, the Supreme Court has undertaken such efforts at the margins of free speech doctrine, where it has identified categories of speech that merit no constitutional protection.154 In the main, however, the Court has insisted that the First Amendment’s free speech protections apply without variance to all speech within its purview.155 Accordingly, an essential-preconditions approach that is grounded on a right to newsgathering, while facially appealing, is flawed. It relies on an uncertain doctrinal basis and sweeps too broadly. The information-production approach set out in Part III, by contrast, need not trigger similar concerns. Unlike newsgathering, which often runs up against government interests in secrecy and information control, a great deal of scientific knowledge production does not seek to discover information from sources with independent national security or privacy claims.156 The natural sciences, for example, produce information about the natural world, which itself has no First Amendment interests. Insofar as scientific research produces information about individual persons, informed consent serves the role of protecting individual interests in privacy and human dignity while not preventing discovery from moving forward.157 Indeed, knowledge production is a qualitatively different act from newsgathering in part because it typically seeks the discovery of truth not already known, rather than broader access to information already possessed by some.158 This difference is most evident in the newsgathering cases seeking access to information held by the government.159 Moreover, the expansive reach of an essential-preconditions approach need not infect the information-production approach. The focus on government suppression of knowledge production set out in Part III differs from the perspective offered by most advocates of the newsgathering analogy. The scope of activities that courts could characterize as essential preconditions to protected speech is nearly infinite.160 The scope of activities encompassed by knowledge production, conversely, is more narrowly defined. This is especially so in light of the limitation of the knowledge-production approach identified here to government efforts to prevent people from acquiring new knowledge.161 Insofar as hesitancy to extend protection to nonexpressive conduct turns on the lack of a limiting principle, the knowledgeproduction approach offers firmer guidance.

### more cards

#### Industry-funded research is productive

Gulbrandsen & Smeby 5 [Magnus Gulbrandsen (Professor, Centre for Technology, Innovation and Culture, University of Oslo), Jens-Christian Smeby, "Industry funding and university professors’ research performance," 5/12/2005] AZ

This article has examined the relationship between commercialisation of research and professors’ research performance. We have found support that commercialisation in terms of industrial funding is significantly related to university professors’ research activity, but that commercialisation in terms of entrepreneurial output is not significantly related to academic performance: • Industrial funding is significantly related to applied research, but not to development work. However, one-third of the respondents did not answer the question about characterisation of own professional activities indicating that many researchers find the distinction between basic and applied research problematic or of limited relevance. • The industry-funded claim to a greater extent that contract research introduces new and interesting research topics and is prerequisite to accomplishing expensive and interesting projects, and they are less worried about negative influences on autonomy. • Industrial funding is related to a highly collaborative mode of research. University professors with funding from companies collaborate a lot more than others with companies and research institutes, but also more with foreign research institutions, the university college sector and with colleagues in their own department. • Industrial funding is strongly correlated with high publication productivities, even when adjusting for types of publication and co-authorships. • Industrial funding and collaboration is strongly correlated with producing patents and commercial products, the creation of spin-off companies and involvement in consulting work (called commercial/entrepreneurial outputs). • Academic publishing and commercial outputs are neither significantly positively nor negatively correlated. Our results on the relationship between industrial funding and academic performance are consistent with Blumenthal et al.’s (1996) investigations of U.S. life science faculty as well as Godin’s (1998) analyses of Canadian university faculty. Godin concludes that Mode 1 (traditional academic disciplinary work) and Mode 2 (trans-disciplinary work in the context of application) are not two alternative modes of research—there is a high degree of heterogeneity in academic research (Godin, 1998; Godin and Gingras, 1998), just as we have found. There also seems to be a complex relationship between the “traditional” type of commercialisation – funding from and collaboration with industry – and “new” forms of commercialisation related to patenting and the creation of new firms.